

epr news letter

2005
volume **15** number **1**



The Publication of the International
EPR (ESR) Society



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The official publication of the International EPR (ESR) Society is supported by the Society, by corporate and other donors, the Zavoisky Physical-Technical Institute of the Russian Academy of Sciences, Kazan, Russian Federation, and the Swiss Federal Institute of Technology, Zürich, Switzerland.

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Please feel free to contact us with items (news, notices, technical notes, and comments) or ideas for the *EPR newsletter*.

The *EPR newsletter* is published quarterly by the International EPR (ESR) Society and is available in electronic and printed form to all members of the Society. The deadlines for submission of news for upcoming issues: Spring March, 15; Summer June, 15; Fall September, 15; Winter December, 15.

ISSN 1094-5571



PRINTING: LaPlume and Sons Printing, Inc.
One Farley Street, Lawrence MA 01843 USA
phone: (978) 683-1009, fax: (978) 683-4594



The cover picture presents the emblem of the World Year of Physics 2005.

TAKE OUR QUIZ!

See cover picture and send an e-mail message to the editor telling what the logo of the World Year of Physics 2005 symbolizes. Deadline August 31, 2005. If we will get more than one correct answer, a raffle will be held to decide who is the prize winner. The prize is an Einstein poster.

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Collected by Arthur Schweiger



ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich



Are you interested to become a member of the International EPR (ESR) Society? Please find the registration/information form for new/continuing members of the IES and non-credit-card payment instructions for individual members on this Web site:

www.epr-newsletter.ethz.ch/contact.html

Editorial

Dear colleagues,

This issue is Einstein-oriented. You will find diverse materials related to the 100th anniversary of Einstein's Annus Mirabilis. Erwin Hahn, the recent Russell Varian Prize Winner (see p. 3), takes us back to April, 1955, when he, with two other people, had the opportunity and privilege of spending about two hours of personal interaction and scientific discussion with Albert Einstein at his home in Princeton. His account, though brief, presents a real view of Einstein's temperament and convictions at the end of his life. Albert Einstein died about two months after this visit. Arthur Schweiger's column "For Your Perusal" shows Einstein in different personifications: as scientist, philosopher, humanist, and human being. All of them show the grandeur of Einstein's personality. Our quiz refers to the World Year of Physics and I hope its emblem presents a solvable problem to our readers.

Richard R. Ernst informs us about another anniversary: 150 years ETH Zürich, and all the jollifications taking place during this year at ETH and at different places in Zürich and in Switzerland. A famous physicist, the Nobel laureate Nicolaas Bloembergen, celebrated his 85th birthday on March 11, 2005. We are happy to present here a very warm and personal article written by Boris Kochelaev, Professor of the Kazan State University. It nicely supplements the interview Nicolaas Bloembergen gave to the *EPR newsletter* (14/1-2, p. 20).

"Imagination is more important than knowledge". You may certainly check the validity of this Einstein saying when reading the essay "Flying in Alaska: Between Two Magnetic Resonance Conferences" written by Marion Thurnauer. With a small

amount of imagination you feel yourself as the fourth pilot in a team flying a single-engine Cessna Cardinal RG airplane to Alaska. Enjoy the beautiful scenery clearly depicted by the author (with input from Alexander D. Trifunac, Chief Pilot)! The same saying refers to the conference report "4th Asia-Pacific EPR/ESR Symposium (APES'04)" written by Sreekanth Anandaram. In addition to a vivid account of the conference itself, its historical diversions will awaken your imagination.

"I never think of the future – it comes soon enough". Bearing the second half of this Einstein saying in mind, it is quite understandable that Kev Salikhov, Editor of Applied Magnetic Resonance, reminds the EPR community about the coming 100th anniversary of E. K. Zavoisky (in 2007) and announces that a special issue of this journal will be prepared to mark this event.

Arthur Schweiger makes a wonderful present to the members and non-members of the IES: a CD containing the pdf files of the volumes 1–12 of the *EPR newsletter*, starting with the first issue under the title "Electron Spin Resonance Centers Newsletter" published on July 31, 1987 and finishing with volume 12, 2002 (for details, see p. 2) is now available. For about 15 years Linn Belford and his team kept the newsletter going with lists of contents covering various aspects of the life of the EPR community. Linn, I admire you!

Not to forget, dear reader, those who confirmed reading my editorials, from now on I write them personally for you. To quote Einstein again: "Insanity: doing the same thing over and over again and expecting different results". I am still looking forward to the feedback from our readers. Hopefully, this obvious evidence of insanity does not frighten the CEOs of the IES.

Laila Mosina

★ IES BUSINESS ★ IES BUSINESS ★

Fellows of the IES Society 2005

• Professor **Harold M. Swartz**, Dartmouth Medical School, Hanover, USA. • Professor **Keith A. McLaughlan**, Oxford University, Oxford, UK. • Professor **Harvey A. Buckmaster**, University of Victoria, Canada. • Professor **George D. Watkins**, Lehigh University, Bethlehem, Pennsylvania, USA.

IES General Meeting 2005

The General Meeting of the International EPR (ESR) Society will take place during the 28th International EPR Symposium in Denver, July 31 – August 4, 2005. All IES members and Conference Attendees are welcome to participate.

IES Newsletters Volumes 1–12 Available on CD

Arthur Schweiger at ETH Zürich has put together a CD containing pdf files of Volumes 1–12 of the IES Newsletter.

He has generously offered to provide copies, free of charge to current IES members, on receipt of an email request. If you would like a free copy please send an e-mail with "Members Newsletter CD" as the title to: schweiger@phys.chem.ethz.ch.

Non members may purchase a copy by paying \$ 10. Please contact Chris Felix (IES Treasurer) cfelix@mcw.edu to arrange payment.

The Russell Varian Prize 2004 to Erwin L. Hahn

E. L. Hahn, Spin Echoes, Bull. Am. Phys. Soc. 24, No. 7, 13 (1949), reprinted in Phys. Rev. 77, 746 (1950). (This is the abstract for a ten minutes presentation to be given at the Chicago meeting of the American Physical Society on November 25, 1949.)

The awarded contribution contains several original ideas and results that have had a strong impact on modern NMR technology, notably:

- the two-pulse spin echo that still is the method of choice for e.g. refocusing chemical shift dephasings in pulse sequences,

not to mention widespread applications in MRI;

- the interpretation of spin echoes, where time (rather than frequency) is used as the essential variable beyond the initial stage of Bloch's theory of CW spectroscopy and of relaxation measurements; this spin dynamics method was immediately essential for the development of spin echo applications, and it is still today the theoretical approach used for most NMR techniques;
- the experimental demonstration that the observation of NMR pulse responses is a viable technology that can provide higher sensitivity than CW spectroscopy.

The awarded contribution clearly was the foundation for the more extensive description of spin echoes in E. L. Hahn, Spin Echoes, Phys. Rev. 80, 580–594 (1950), that was submitted six months after the lecture at the Chicago meeting, where further high-impact ideas related to spin echoes were presented:

- the study of molecular diffusion and bulk motion by observation of their effects on the spin echoes: with minor modifications, this is still the method of choice for accurate measurements of molecular diffusion coefficients in liquids and for flow measurements in general;
- the study of “secondary” spin echoes after three pulses, another step towards multiple-pulse techniques;
- the observation of a modulation of the peak spin echo amplitudes in some homonuclear spin systems and the conclusion



Awards

that the modulation cannot be explained by differences in chemical shifts, hence that it indicates a new spin-spin coupling not averaged out by molecular motion. This proved later to be J couplings. It also showed that multiple-pulse spectroscopy provides important qualitative information that was not directly available by CW techniques;

- the description and use of a coherent pulse spectrometer including a CW reference oscillator at the NMR frequency, hence control of the phase of the pulses and observation of the phase of the spin responses: the basic elements of modern pulse spectrometers are presented here for the first time.

The IES Gold Medal 2005

Wolfgang Lubitz

MPI for Bioinorganic Chemistry,
Mülheim an der Ruhr,
Germany

The IES Silver Medal for Instrumentation 2005

Jos A. J. M. Disselhorst

Leiden University, Leiden,
The Netherlands

Detailed information on this award will be given in a future issue of the *EPR newsletter*

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Contributor to the International EPR Society

On August 14, 1982 we were flying 500 feet above the Chukchi Sea headed southwest following the coastline of the Seward Peninsula, Alaska. After three days of rain, we had departed earlier from Kotzebue, a native village above the Arctic Circle, named after the Russian navigator of German descent who charted much of this coast. We had a clear day for continuing our aerial adventure over this vast land of ever-changing vistas. First we flew east from Kotzebue above the Kobuk River valley where the boreal forest reaches its northern

Hills appeared out of the flat landscape as we approached the Bering Strait. The strait is named for the Danish explorer Vitus Bering who, at the behest of Czar Peter the Great, in 1728 sailed around the northeast corner of Asia, proving the existence of two separate continents. During the Ice Age, when the sea level fell, this is where humans crossed from Asia to populate the American Continent. Now, the Bering Strait is the fifty-five mile wide gap where Russia and the United States come together. In the middle, two islands rise above the sea. Big Diomedes, on the west, is separated by two miles from Little Diomedes, and both the international dateline and the border pass between them. It was easier for humans to walk across the land bridge 13,000 years ago than to fly or sail across the

mosaic as the site of the finish of the grueling 1049-mile Iditarod Trail Sled Dog Race¹ that begins in Anchorage. After such a perfect day, we landed in Nome and found lodging for six dollars each in the choir loft of Nome's Methodist Church. We wrote a postcard to Kev Salikhov sending our greetings to our friends in Novosibirsk. Over dinner at a Chinese restaurant we discussed the roundabout route that postcard would take to reach Siberia. The next morning we were awakened by the Sunday church service below, and we quickly cleared out.

With almost three weeks between the International Symposium on EPR, Denver, Colorado and the 10th International Conference on Magnetic Resonance in Biological Systems, Stanford, California that we were

FLYING IN ALASKA

between Two Magnetic Resonance Conferences

Marion C. Thurnauer

with input from Alexander D. Trifunac, Chief Pilot

limit. Patches of tundra were visible between the spruce and birch which already showed hints of yellow. In the middle of this lush landscape a mini Sahara appeared below us. We circled above the Kobuk sand dunes, a twenty-five square-mile desert, formed from the windblown outwash of the melting Ice Age glaciers, which remains barren due to the constant wavelike motion of the sand. About an hour later and a few hundred miles southwest, we were following the flat, expansive coastal plain patterned by hundreds of pools of water spawned from the many streams winding to the sea. The marshy landscape was a mosaic of different hues of yellow-greens, red-browns, and blues. The only indications of human habitation were a few small clusters of brightly colored cabins built beside short runways, situated on thin strips of land that stretched along the entire coast.

Bering Strait in 1982. As we approached the east coast of Little Diomedes Island we saw radar antennas high on the Alaska mainland, and the yellow light on our airplane's transponder began to flicker, indicating that our track was being monitored. We could almost feel the many eyes watching us from both east and west as our little aircraft crossed the coordinates where on the aeronautical chart a special message was printed: *FAA urges all pilots operating in the BERING STRAIT area to take utmost precaution to avoid USSR airspace.* We carefully held our course.

The coastline took us southeast. We saw movement on the green expanse below, and descended to a lower altitude to view large herds of grazing caribou. More coastal hills appeared. As we rounded them, we spotted Nome, Alaska, a gold rush boom town at the turn of the twentieth century. Now it is fa-

scheduled to attend, we saw an opportunity in August of 1982 to fulfill our dreams of flying our single-engine Cessna Cardinal RG (retractable landing gear) airplane to Alaska. Our friend and colleague, Reinhard Furrer, who was planning to attend the conference in Denver, joined us as a third pilot. At the Denver conference when we mentioned our destination, many were surprised that our plan was to have no plan. This turned out to be the best approach to flying in Alaska as we followed the route of good weather. We would fly as much as possible under Visual Flight Rules (VFR), meaning freedom to fly where we wanted as long as we did not fly into clouds or controlled airspace, because

¹ The race commemorates the relay by twenty dog teams to bring serum 674 miles in 27.5 hours to fight a diphtheria epidemic in Nome in 1925.

we hoped to view everything we could. We would try to avoid flying under Instrument Flight Rules (IFR), which means flying a specified flight plan under positive control of flight controllers so that one can fly through the clouds. In this case, one is either flying 'in the clouds' or above an overcast layer, and cannot see the ground. In general, we intended to enter Alaska on its eastern border with Canada, fly west across the state and down the coast of southeast Alaska returning to the United States via Canada.

Our trip began on August, 6 when we departed from Boulder, Colorado, flying north over Alberta, Canada, landing in Calgary. The next day we 'picked up' the Alaska Highway at Milepost 1 in Dawson Creek, British Columbia. The 1500 mile highway (also known as the Alaska-Canada Military Highway – Alcan) running from Dawson Creek to Fairbanks, Alaska was hastily constructed in eight months, beginning in March 1942. Following the attack on Pearl Harbor in December, 1941, Alaska was considered vulnerable to invasion by Japan, making a ground route to the territory a necessity. The highway was built along a line of existing airfields which remain beside the road, and 'flying' the Alcan to Alaska is considered to be the safest route since these airstrips offer emergency landing sites. However, as we followed the highway, we all agreed that if we were forced to land we would choose the road rather than the old air strips which appeared in disrepair.

We entered Alaska at Northway (Milepost 1264) at around noon on August 8. The chill in the air added to our excitement of having arrived. After clearing customs and changing to warm clothes, we departed and followed the glacial fed Tanana River that flows through a wide open valley, dotted with bright blue lakes, to land in Fairbanks. The grim and gray feeling of Fairbanks was in sharp contrast to its surroundings that we had just witnessed. The city is situated on permafrost and is often covered by ice fog in winter. In addition, the 1977 opening of the 800 mile long Alaska oil pipeline that stretches from Prudhoe Bay to Valdez, offered excuses and opportunities to make a quick dollar. So our first night in Alaska was spent in a dark, dingy, windowless, yet expensive motel room, making us even more anxious to get into the wilderness.

The next morning we went straight to the Flight Service Station (FSS) at the Fairbanks airport for advice on flight destinations, given the current and forecast weather conditions. Because airplanes are such an important



mode of transportation in Alaska, we found the FSS staff always eager to help us. We decided to fly north to the Brooks Mountain Range, a mountain chain that extends about 600 miles from east to west across northern Alaska. When we departed the clouds were low. This did not deter us because the excellent visibility made it possible to visually navigate around the mountain tops even though many were covered by clouds. We followed the oil pipeline below until we came to a large valley where the overcast sky broke up into scattered clouds. A little farther along, we saw a downed white airplane that stood out as it lay 'spread-eagle' amidst dark green surroundings. We were pondering the fate of the plane's occupants and how long it had been lying there, when we came to a desolate gravel surface runway next to Lake Chandalar about two hundred miles north of Fairbanks. The surrounding mountains and soft white clouds were perfectly mirrored by the lake, and, for a moment, in the turn to the final approach to landing, the whole scene reflected from the bottom of our plane's wing. We camped two days in this serene setting watching the changing light and reflections from Lake Chandalar. We hiked above our campsite and experienced the difficulties of walking on tundra, soggy from the late summer melt of the permafrost. We tried to use the tight clumps of vegetation as 'stepping stones', but felt like clumsy elephants as the grasses fell on their sides almost uprooting with each step. Apparently, and fortunately, this fragile ecosystem has a built in protection from swarms of hikers. On departure from Lake Chandalar we were both lucky

and careful not to damage our airplane, because 'gravel' was an understatement for the stones that lay on the runway. Without the large, soft 'tundra tires' that were on the local airplanes ('bush planes') we planned to stick with smoother or paved airstrips.

We continued our way westward. Every flight leg presented new vistas, and each place we visited offered different experiences. We stopped in the middle of the State at Manley Hot Springs, where it seemed like we had stepped into one of those eerie stories about a town that time forgot. The sixty-five or so residents appeared to be impervious to the rest of the world, including us. The town's campgrounds were in disarray, so we took rooms at Manley Hot Springs Roadhouse, an incongruous name for a lodge in a town situated on a highway that dead-ends right there. The Roadhouse opened in 1903 as a service and supply point for miners when Manley was a busy trading center for the nearby mining districts. The main sitting room was filled with pieces of furniture and artifacts that must have been there since 1903. The glow of afternoon light coming through the line of antique colored glass bottles perched on the windowsill provided a welcome warmth and homey feeling in contrast to the strange atmosphere. Near the roadhouse, we found a decaying concrete shack that enclosed a hot springs bath, where with an appointment and \$ 5.00 one could have a soak. All through the night and early morning hours, we heard sounds that suggested considerable activity in the Roadhouse. However, when we had gone to our rooms in the evening and when we got up to make our 8:00 am appointment

at the hot springs we could see from all of the open doors that no rooms other than ours were occupied. Perhaps the ghosts of miners remained at the Roadhouse along with the furniture?

When we were leaving Manley Hot Springs, already in our airplane, a woman ran over to us shouting, “You have such a lovely plane, would you please sign our guest book?” and then presented us with a pen from Manley



Marion Thurnauer

Hot Springs. We were unsure how to interpret such an enthusiastic ‘welcome’ to departing visitors. Was this the strategy of the residents of Manley Hot Springs for keeping down the number of tourists? We took off headed for Kotzebue and Nome.

Being situated on permafrost Kotzebue appeared rather dreary, particularly with the continuous rain we experienced. The native village was mostly low wooden houses, each having a family of huskies tied in front. Somehow the dogs were exceptionally clean in spite of the fact that it was muddy everywhere. There were various ‘machines’ strewn around the village, snowmobiles on roofs or on the ground, boats in the middle of the streets, and a number of large luxury cars even though the roads did not continue much beyond the town. During the summer months most of the residents left their huts and camped in tents along the coast about a mile or two from the town in order to fish. We set up our tent near the airport between the native ‘tent city’ and a row of metal houses where people who worked for the FSS lived. We found it impossible to purchase a fish in town. We came upon several people in the FSS village who were

unloading a truck full of fresh whole salmon that had been accidentally killed in a fish-tagging exercise. They simply gave us one which we had to wash in the cold Chukchi Sea after it slipped through our inexperienced hands a couple of times as we tried to hold it. The fresh fish was a delicious change in fare even though we cooked and ate it under a rain-soaked lean-to erected in front of our tent.

We were lucky the day we flew southeast through the Bering Strait as most of the time the coastal skies were overcast. From Nome we flew IFR to King Salmon, headquarters for Katmai National Park (established in 1980). The park is located thirty-three miles from King Salmon and can only be reached by boat or float plane. In 1982, we were unable to find transportation to the park². We departed King Salmon in IFR conditions, knowing that it was clear at Kodiak Island. Once we were above the cloud layer, the view toward the Alaska Peninsula in the southwest was surreal with black peaks poking out of



**Alex Trifunac (top) and
Reinhard Furrer (bottom)**

the white clouds. As we flew further, crossing the Peninsula, the clouds began to break, revealing the rugged mountains standing out against the strong blue color of the water. Then, just ahead, we saw Kodiak Island’s dark green mountains, plunging into the sea. We landed on a runway that ended at the foot of a mountain. Kodiak Island is famous as home to the Kodiak brown bear, the world’s largest carnivore and for its stark beautiful green landscape which is often compared to New Zealand, Ireland, or Norway. The climate is relatively mild because Kodiak lies in the path of the Japan Current. On this warm, sunny day, the airport terminal was bustling with tourists as if we had just arrived on a tropical island. The festive atmosphere inspired us to rent a car to tour Kodiak Island. Nevertheless, this was still Alaska, so to continue to ‘rough it’ and also save a few dollars we procured a car from ‘Rent-a-Wreck’, a company that rents old used cars.

We drove the short distance to the town of Kodiak, a picturesque fishing port, with a surprisingly pleasant smell from the several fish canaries. A Russian Orthodox Church, with blue onion domes, stood as a reminder of the Russian colonization of the Kodiak Island Archipelago in mid-1700. Again, we were unable to purchase a fresh fish even though everything around related to ‘fishing’. So we purchased a fishing license along with other supplies, and headed out of town, in a car loaded with all of our gear.

Looking back on our visit to Kodiak Island, the sheer beauty is the first and foremost memory. In the bright sunshine it seemed that everything was sharply defined by four intense colors. The treeless green mountains appeared to rise directly out of the azure blue sea. Large flocks of white birds stood out against the black sands and the perfectly clear blue sky. In the peaceful setting, it was difficult to imagine that in the past several natural disasters have ravaged the island. Kodiak was dark for three days in 1912 when Mount Novarupta on the Alaska Peninsula erupted, spewing layers of ash on the island. In 1964, Kodiak was hit by a tsunami following an earthquake with epicenter in North Prince William Sound.

We saw fish jumping in the streams and small lakes and fishing became the major topic our conversation. Although preoccupied,

² We returned in our airplane nine years later, entered the park via float plane and made an eighty mile kayak trip on the so-called Savanoski loop, but that’s another story.



we noticed that the gray volcanic dust from the road began to leak into the car. It was insidious and started to penetrate all our gear and bags, and there was nothing we could do to stop it. We set up camp by a stream on the beach, but the fish eluded us. Talking of bears and tsunamis we crawled into our small tent which stood alone on the beach. We were relieved in the morning to find that we had been spared from the natural disasters, but discovered that during the night 'the wreck' had developed a flat tire. We should have returned to the town with our rather dubious looking spare tire, but our focus remained on fishing. So we packed up our gear and drove to another beach. After further unsuccessful attempts to catch an edible fish we found our car stuck in the wet black sand. Given that we had no tools or rope, we tried whatever we could to free the car, including digging with our bare hands. We only became dirtier. The situation looked hopeless until a man and woman in a pickup truck stopped, and without more than three words, hooked a chain to the car, and easily pulled it out of the sand with their truck. With our bad tire, we limped back to the town of Kodiak. In order to clean up ourselves and all our gear, we checked into another overpriced motel, spending much more than we had saved renting 'the wreck'. Over beer at the Anchor Bar, located on the commercial fishers' pier, we waited our turn for the in-bar coin-operated clothes washing machines. We overheard many fish stories but resisted telling ours.

From Kodiak we flew east across the Gulf of Alaska. The jagged coastline was a continuous series of deep coves and fjords forged by ancient ice. Rocky islands rose about 1000 feet straight out of the sea. One of them appeared to have a strange looking cloud hovering at its tip. As we passed close to this island we could see that this was an active volcano. We approached the Kenai Peninsula, and continued to Anchorage going north along

Cook Inlet, named after the famous Captain James Cook who in 1778 charted much of the northwest coast of the American Continent. It took less than two hours for us to realize that we were not ready for city life. Therefore, we departed and turned back south, following the winding road which snaked through several deep canyons to

end at Seward, a picturesque town situated at the head of a deep fjord, with Mt. Marathon towering above it. We landed on an airstrip in the middle of a field of fireweed, whose strong purple color stood out in the light from the late afternoon sun. With the sea as a backdrop, this 'real-life poster' depicting a 'typical' Alaska scene reminded us that it was appropriate to name this town after the U.S. Secretary of State William Seward who in 1867 negotiated the purchase of Alaska from Russia. At the time this action was called 'Seward's Folly' or 'Seward's Icebox'.

We arrived at Seward during the annual Salmon Fishing Derby. This is an event for serious sports fishers, and we knew that we did not qualify to participate with the 20,000 people visiting Seward for this event. With no hope of finding lodging, we camped at the airport next to a stream in the meadow between the runway and the bay. In the small airport building we encountered a rough-looking man who was biding his time waiting for clients to book scenic airplane rides with him – a real-live bush pilot. Knowing that we had our own plane, he did not try to sell us a ride, but entertained himself and us with

wild stories of hunting, fishing, and flying in Alaska – landing on beaches and glaciers. He talked about flying his Beaver, a rugged bush plane, with so much engine oil leaking onto his windshield that he covered it with layers of plastic sheets which he pulled off one by one as they became covered with oil.

The bush pilot gave us a graphic picture of the area around Seward. Behind Mt. Marathon is the Harding Icefield, named after the twenty-ninth U.S. president, the first to visit Alaska in 1923. The Icefield, about 700 square miles of mile thick ice, is a vestige of the massive ice sheet that covered Alaska during the Pleistocene Era³. It feeds more than thirty glaciers, eight of which flow directly into the sea. We set out to see the Icefield by first flying over the bay with hundreds of fishing boats below. Soon we were flying 'up' two glaciers. When two glaciers flow downward at different rates, there is a distinct brown band of dirt lying between them, like a road up the mountain. When we came to the top, we saw the expanse of ice entombing valleys and mountain slopes. Only black rugged peaks called nunataks ('lonely peaks') by the Eskimos stood out. This spectacular sight soon ended as we came to the coast which looked entirely different – relatively flat with foothills in the background. We flew north past Anchorage to Talkeetna and directly ahead was the imposing massif, the highest mountain, at 20,320 feet, on the North American continent, Denali⁴ which is the

³ 1.8 million to 10,000 years Before Current Era (BCE).

⁴ Officially called Mount McKinley, after President McKinley, the twenty-fifth president of the U.S., elected in 1896 and assassinated in 1901 during his second term.



Athabaskan Indian word for 'the High One' or 'the Great One'. We were lucky, there were no clouds, but more important for us to fly near the peak, the air was perfectly still. We climbed to 14,000 feet. The experience was breathtaking, not only because of the thin air which meant that legally we could only remain at that altitude for thirty minutes. We passed straight walls of ice and large, spiraling ice peaks. There were glaciers all over the mountain. We flew once around the mountain peak and looped back for a short way before our time at that altitude was over. We descended and returned to Seward. Feeling exhilarated we entered the airport hut to describe our experience to the bush pilot. To our surprise he was sitting there quietly working with his grease-stained hands on his crewel embroidery piece, his pastime while waiting for customers. Walking back to our tent in the light of the setting sun, the fireweeds lived up to their name. Then clouds came to cover the valley. We had been extremely lucky with the weather that day.

The next morning we took off for Southeast Alaska. The clouds were low, and we flew at treetop level over the seacoast from Seward to a place called Yakutat. Flying at

that altitude we had the true sensation of our 160 miles/hour speed. On the beaches below we saw moose, bears, seals, and eagles in the trees. The moose ignored us, the bears ran from the beach as we flew overhead, and the seals looked up to acknowledge our passing. The eagles' heads moved from one side to the other as they made sure we passed by. After refueling we continued our flight to Juneau, the capital of Alaska. On the way we passed over Glacier Bay, an area that encompasses at least sixteen glaciers, all ending at the sea, where they 'calve' great icebergs with a loud thunder. The bay has drawn visitors for two hundred years because it is a living laboratory for observing the processes that follow glacial retreat. The area is dotted with rainforests and teeming with wildlife, both on land and in the sea. We had visited Glacier Bay by boat in 1973 and now, from above, could see how some glaciers had retreated in the intervening nine years. We landed in Juneau, the capital of Alaska. Juneau was the first Alaska town that in 1880 was established as the result of a gold strike. It is a lovely old city situated on the side of a hill, which limits its growth. Even as we neared the end of our stay in Alaska, we were still astonished to see eagles

flying around the town like the sparrows we were used to seeing at home.

From Juneau we flew to the town of Ketchikan. The salmon were 'running' upstream. The water appeared to be boiling with fish. Finally, we were catching a fish with each cast. But our fishing gear and line were not up to the task of actually bringing in a salmon, and broke each time we tried. But on our last night in Alaska we had the satisfaction of catching fish.

After leaving Alaska, we flew back to Colorado, where Reinhard Furrer departed for Germany. As we flew from Colorado to California the Rocky Mountains did not look as spectacular as they had before. We were reminded of a quote by Henry Ganett, President of the National Geographic Society, member of the 1899 Harriman expedition to Alaska:

"There is one word of advice and caution to be given those intending to visit Alaska for pleasure. If you are old, go by all means. But if you are young, wait. The scenery of Alaska is much grander than anything else of the kind in the world and it is not well to dull one's capacity for enjoyment by seeing the finest first."

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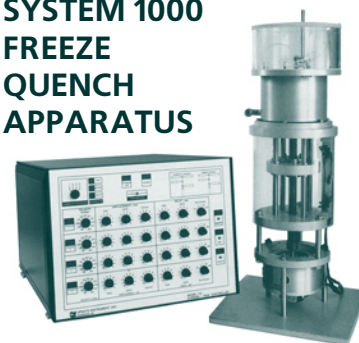
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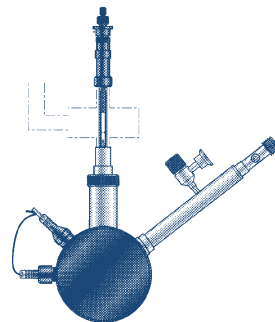
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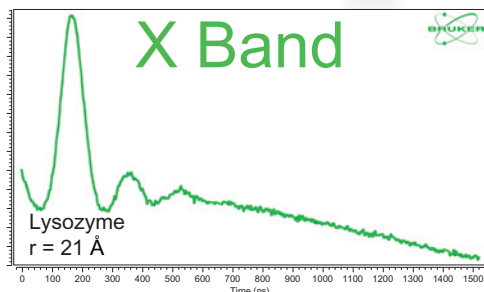
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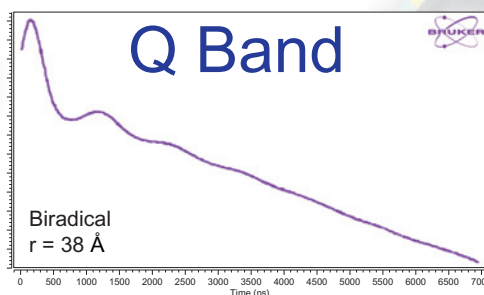
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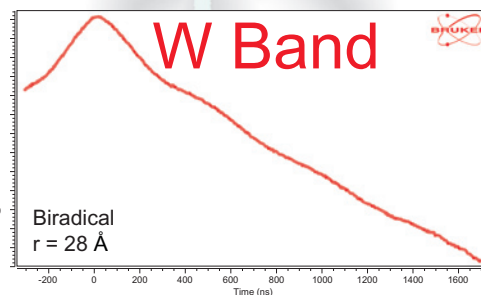
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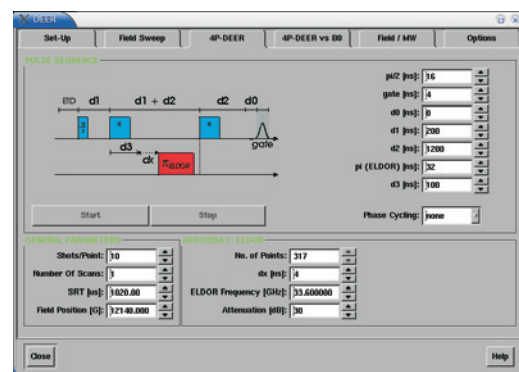
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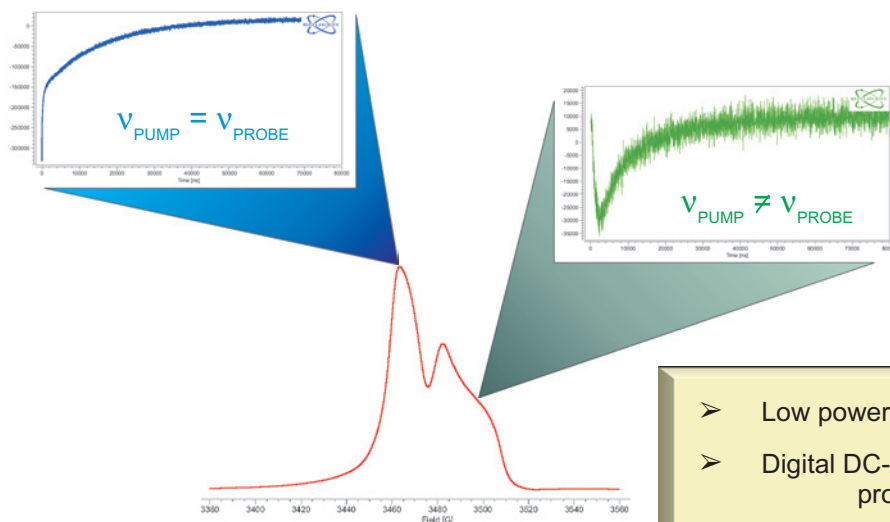
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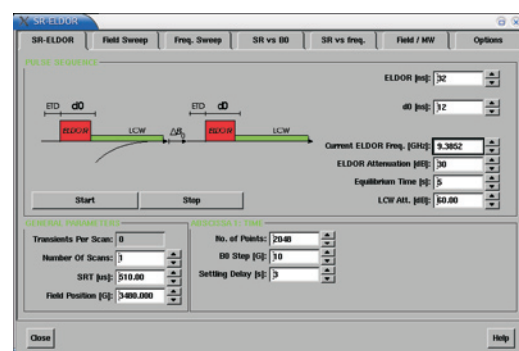
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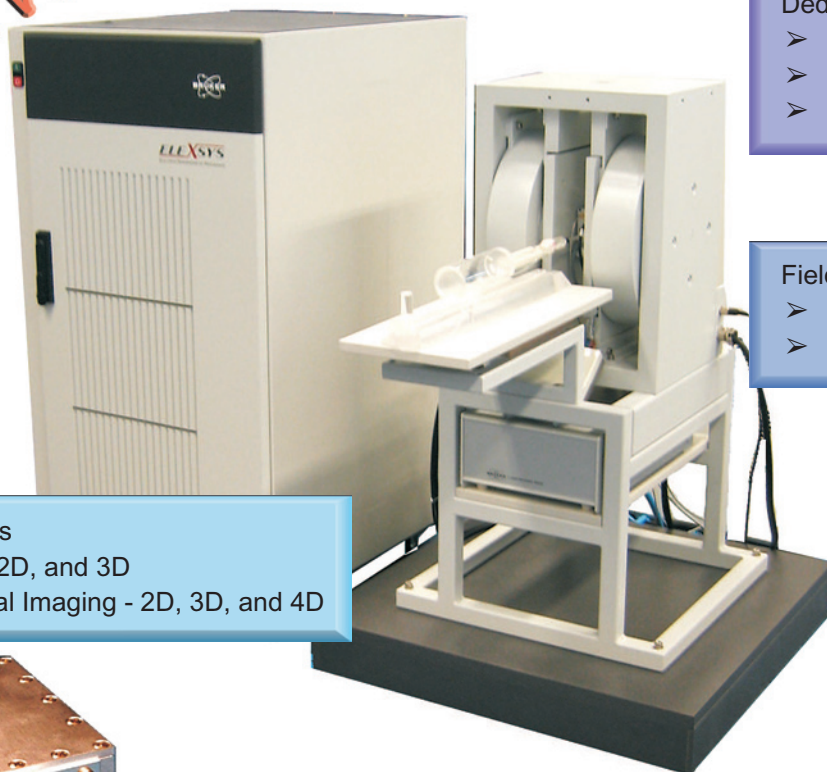


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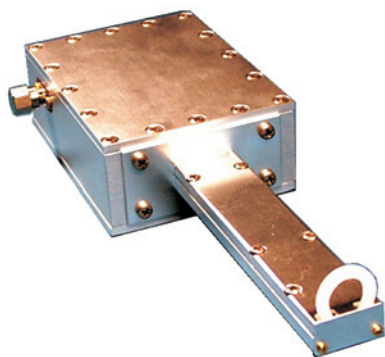
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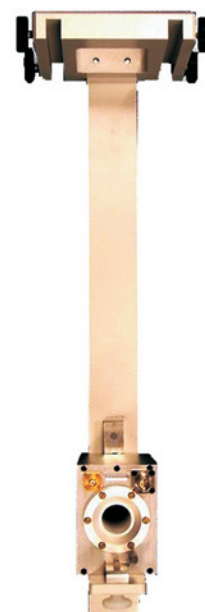
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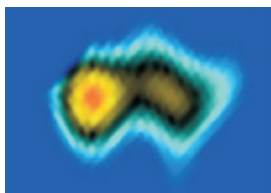


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Rat Brain Ischemia-Reperfusion Injury

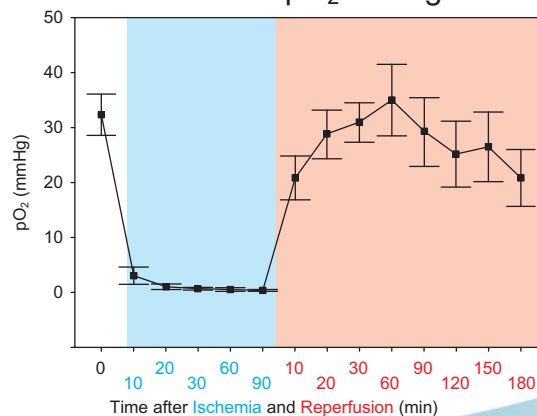


Histological Image
Red = viable tissue
Yellow = dead tissue



in vivo EPR Image

Ischemic Core pO₂ Changes



Data and Images courtesy of
J. Liu, S. Liu, and G. Timmins

150 Years ETH Zürich

In the course of this year, ETH Zürich, the Eidgenössische Technische Hochschule Zürich, or the Swiss Federal Institute of Technology in Zürich, celebrates its 150 Years Jubilee. I was asked by Prof. Arthur Schweiger to write a few words on this famous school and research institution.

The history of ETH Zürich is as old as the history of modern Switzerland. Our country, in its present form, emerged from the after-effects caused by the occupation of Switzerland by Napoleon. The Constitution of the Schweizerische Eidgenossenschaft was enacted on September 12, 1848. It contains the most relevant Article 22: "Der Bund ist befugt, eine Universität und eine polytechnische Schule zu errichten". ("The Confederation is entitled to establish a University and a Polytechnic School".) So far, no Federal University has been initiated as there are today, with ten Cantonal Universities, plenty places of higher learning. But the need for a Federal Polytechnic School became rapidly accepted. It was founded 1855 in Zürich with the goal of stimulating the industrial development in Switzerland. Initially, it consisted of only three departments: civil engineering, mechanical engineering, and chemistry.

ETH Zürich started its operation with 71 students in the fall of 1855, but it had already famous teachers on its staff, for example the physicist Rudolf Clausius (active at ETH: 1855–1867, the father of the second law of thermodynamics), the art historian Jakob Burckhardt (1855–1858), and the most famous architect of his time Gottfried Semper (1855–1871). Semper himself has also



designed, after an unsuccessful public competition, the main building of ETH Zürich, which was inaugurated 1864, together with an astronomical observatory of his design. His first opera house was opened in Dresden already in 1841, and, after its destruction, the second one in the year 1878.

Since its foundation days, ETH Zürich developed steadily and quite well. Many famous teachers and scientists have been active at ETH Zürich. A few of them received a Nobel Prize while active at the school: Leopold Ruzicka, Chemistry 1939 (1929–1957); Wolfgang Pauli, Physics 1945 (1928–1958); Vlado Prelog, Chemistry 1975 (1947–1976); R.R.E., Chemistry 1991 (1971–1998); and Kurt Wüthrich, Chemistry 2002 (1972). Some of them received a Nobel Prize later, such as Richard Willstätter, Chemistry 1915 (1902–1912); Albert Einstein, Physics 1921 (1912–1914); Peter Debye, Chemistry 1936 (1920–1927); Richard Kuhn, Chemistry 1938 (1926–1929); Thadeus Reichstein, Medicine 1950 (1937–1938); and Hermann Staudinger, Chemistry 1953 (1912–1926). Mathematics at ETH Zürich had a exceedingly successful history with names, such as Georg Ferdinand Frobenius (1875–1892), Alfred Hurwitz (1892–1919), Hermann

Minkowski (1896–1902), Hermann Weyl (1913–1930), Michel Plancherel (1920–1954), Georg Polya (1928–1942), Beno Eckmann (1948–1977), Armand Borel (1955–1957) Rudolf E. Kalman (1973–1997), Jürgen Moser (1980–1995) and many more.

Today, ETH Zürich has 12600 students and a faculty of 356 Professors. ETH Zürich has become one of the few top Universities in central Europe. Its ratings are invariably first class. This has much to do with its relatively generous autonomy and its still adequate financial situation, although the latter is much endangered today by the financial bottleneck of the Federal finances.

This year, we are celebrating the past successes and are preparing the foundations for a bright future of ETH Zürich in view of its public services. We are aware that excellent basic science and good science teaching are prerequisites but are not sufficient for satisfying all the public functions of a University. A University is not merely a training ground for top-class (EPR) specialists, but it should act as an inspiring cultural center with a wide public radiance. It is supposed to accept responsibility for the future development of the global society by developing models of peaceful coexistence. After all, at Universities, future generations of leaders are educated, hopefully with beneficial ideas implanted into their brains. In this sense, the major activities during this Jubilee are addressing the general public in the hope of stimulating an active discourse between University and the society.

Let me mention a few specific activities. The project "150 ETH Professors in Dialog" encompasses about 450 30–60 minutes dialog sessions of professors at some strategic points within the city of Zürich. A special pavilion type has been developed that will house the sessions at the end of April and beginning of May. The project has the goal of catalyzing direct contacts between ETH professors and the public in the streets of Zürich. Not just lectures but a two-way discourse is intended. Connected to this event are exhibitions just across the street of Zürich's main station under the heading "Worlds of Knowledge". Within another project, already thousands of primary and secondary school children have visited ETH, attending lectures and being involved in fascinating experiments. Just last weekend, the chemistry department had two quite successful open-days, demonstrating to the public its activities.



A special stamp created for the ETH Jubilee

But there are also more unconventional activities planned. During the month of May, a new Musical Theatre Play by Carl Djerassi, "Calculus", with music by Werner Schulze will have its first world performance in Zürich. On August 4, a Symposium on the subject "Fear and Anxiety" will be organized at ETH Zürich with the participation of His Holiness, The Dalai Lama.

A large number of envelopes with the ETH Jubilee stamp was signed by one of ETH's Nobel laureates. A special ETH Swiss Railway Engine will be launched this summer. There will be a Night of Physics in June. In the Fall, ETH-Visions will be developed in the context of teaching, research, equal opportunities, Nobel Prizes, alumni, politics, business, and other Universities.

Perhaps, some of the readers might feel motivated to attend one or the other of these activities and celebrate with us the extended 150th birthday party of ETH Zürich. The detailed program can be found at www.150jahre.ethz.ch.

Richard R. Ernst

85th Birthday of Nicolaas Bloembergen

A famous physicist, the Nobel Prize laureate Nicolaas Bloembergen, celebrates this year his 85th birthday. His name is well known and highly esteemed by the EPR community, although the Nobel Prize has crowned his fundamental contributions to nonlinear optics, and only the beginning of his scientific career and the first quarter of his publications were related to magnetic radio-spectroscopy. Nevertheless, we know Professor Bloembergen as a classic of magnetic resonance due to his pioneering work on nuclear spin relaxation and spin diffusion in liquids and solids, his EPR studies of solids activated by paramagnetic impurities, and his famous proposal of the three-level maser[s]. By the way, among the four key papers of Bloembergen included in the volume prepared by his former students and associates in honor of his 70th birthday [1], we find two papers related to magnetic resonance [2, 3].

Professor Bloembergen made a great contribution to the progress of science not only by his outstanding personal scientific work, but also as an educator and inspiring teacher, both because of his profound knowledge of physics and his interest in people. The list of his former students and associates given in [1] contains more than one hundred names of men and women he taught and encouraged to continue scientific work in a broad range of fields. I was lucky to be among them, having the opportunity to work at Harvard University under Bloembergen's supervision during the academic year 1963/64.

I was impressed by Bloembergen's passion for science, by his willingness to study some-

thing new. I remember, in particular, that he attended regularly, together with young people, the lecture course on coherent optics of the theoretician Professor Glauber and studiously took notes in a thick writing-book. His influence on the coworkers was very strong. In discussions about physics

abroad could enjoy the hospitality of his family, especially his wife Deli. I am sure that many of us remember the warm atmosphere at their home with cognitive conversations and classical music. It seems to me that curiosity is their family feature. Once Deli took me to the school of their children, where,

during a geography lesson, instead of visual aids, I had to answer a lot of questions about my country. Another situation I experienced in Moscow, where Deli and Nico accepted my idea to visit the Troitse-Sergieva lavra (monastery) near Moscow instead of having dinner, which was planned according to the official program at the top of the television tower. Actually, our trip became an adventure, since a service of the Patriarch of all Russia was expected and the train to Zagorsk and everything were overcrowded. But Nico happened to be much more effective than I was: while we became confused, Nico was

already in the train waving us from the window and urging us to come in.

We all wish Nicolaas Bloembergen good health, a cheerful mood and many other happy birthdays to come.

Boris I. Kochelaev



Nicolaas Bloembergen (left) and Boris Kochelaev (right)

he was hard and precise, being at the same time open for other views and arguments. As a matter of fact, my work in the field of EPR of superconductors with paramagnetic impurities started with the task, whether the indirect coupling between impurities in a normal metal via conduction electrons can be modified by their spin polarization. This task was given to me by Professor Bloembergen, although at that time, his interests were switched already to nonlinear optics. Fifteen years later, during my stay at UCLA, he invited me to Harvard to give a talk about EPR of superconductors.

As far as I know, Bloembergen's team was always quite international. People from

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Einstein Tidbits

Erwin L. Hahn

During April of 1955, about two months before the death of Albert Einstein, my colleague Professor Eugene Commins of our University of California Physics Department was at that time a Columbia Physics graduate student who interacted with the Watson IBM Laboratory in New York where I was a research physicist. Eugene grew up in Princeton in an old house situated across the street from where Einstein lived on Mercer Street. As a personal friend and colleague, Gene kindly invited me, together with his brother-in-law Bill Bennet (then a physicist at Bell



Labs), for an afternoon visit with Einstein during a weekend. Gene had known Einstein from the time he was a child, and in fact, after Gene took up the violin he would on occasion play violin duets with Einstein.

On a Saturday I arrived with Bennet, first to Gene's house, and from there the three of us walked across the street to the Einstein abode where Mrs. Dukas, Einstein's housekeeper, directed us to his study. Needless to say I was benumbed at the prospect of meeting this giant of the ages, and I began to sweat a little. As we entered a long hallway leading to his study my head bumped into a naked light bulb. That was my first inkling that this visit was not to be very formal and my tensions evaporated. As we entered the study, there Einstein sat, just as you would imagine, with his rangy crop of tousled gray hair, wearing a rumpled sweatshirt, and with slippers on his feet. He was sitting at a large round table where a bowl full of old well-used pipes occupied the center, and books were distributed at random on the table. The only luxurious feature of his study was a large plate glass window with a view to a garden in the backyard of the house.

Einstein greeted us, speaking in a heavy German accent, and asked what each of us did in our research. I indicated that I was leaving Watson IBM Labs at Columbia to take up an appointment at Berkeley, at which point Einstein asked that I transmit my regards to his son Hans who was at the University of California at that time as a professor in hydraulic engineering. After a few further amenities the conversation then became rather general with the following question by Einstein: "Why didn't Lee de Forest win the Nobel prize in Physics for his invention of the triode? After all, it made possible many important physical measurement and discoveries". We argued that probably since de Forest was not a physicist, but rather an engineer, the Nobel Committee was too snobbish to recognize his invention. From Einstein this question had a natural logic since he himself was at one time a patent examiner while he invented relativity. Then, as I remember, the conversation drifted over into the subject of quantum mechanics, and Einstein literally reiterated his disbelief in the probability interpretation. He admitted that although quantum mechanics predicted certain phenomena mathematically, he felt there was something missing in the interpretation as to why it worked so well.

Let me point out parenthetically, which one can say in retrospect, that Einstein seemed to be very tired, and an attitude of

resignation seemed to characterize his mood and conversation. His close associates have observed that he became somewhat depressed in his last years because of his failure to formulate a unified field theory. He was, in fact, an ill person afflicted with vascular problems. He died of a burst aorta just two months after our visit.

There is not much more I can remember about our general conversation except for two more items. We noticed that Einstein did not keep up with the latest developments in physics. He was unaware of the Lamb shift discovery in hydrogen. Somewhere along the line we got on the subject of Oppenheimer, whereupon Einstein remarked: "Achh, Oppenheimer is a very complicated man!" History indicates that this was indeed the case. Of course Einstein interacted with Oppenheimer, who at that time headed the Institute for Advanced Studies at Princeton.

I was filled with awe by the conversation, and from noticing the old physics and math books in Einstein's study. Here I was in the presence of a luminary from the era gone by whose physics changed the world. His views seemed classical and yet at the same time he was non-classical. Initially he was a revolutionary, hard to understand, which made him the target of the Nazis as a perpetrator of Jewish Physics. Many people have made attempts and some still try to prove that Einstein's physics is all wrong.

This ends my story of the interview with Einstein. It is well known that Einstein had a very good sense of humor. This is one of his favorite stories. Once, during a gathering of the Bnai Brith in honor of Einstein, a little old Jewish lady asked him, "Tell us, Dr. Einstein, vat iss relativity?" Einstein responded, "Madam, it's like this. If you put your hand on a hot stove it seems like an hour, but if a beautiful lady sits on your lap it seems like a minute." The lady responded, "From this you make a living????!!!"

Then there is the classic absent-minded story about Einstein. He called up Mrs. Jones on the phone and said: "Mrs. Jones, I wish to apologize for not showing up at your party the other night in response to your kind invitation." Mrs. Jones said: "Oh, that's all right, Dr. Einstein, you need not apologize. You were there!"

There is much more to be learned about Einstein from the numerous biographies about him. All I can say is that it was quite a privilege for me to have met Einstein, tantamount to almost having met Moses himself.

4th International Conference on Nitroxide Radicals: Synthesis, Properties and Implications of Nitroxides SPIN-2005

Akademgorodok, Novosibirsk, Russian Federation
September 20–24, 2005
www.nioch.nsc.ru/conf2005

The meeting will be hosted by the Novosibirsk Institute of Organic Chemistry in cooperation with the International Tomography Center, the Institute of Chemical Kinetics & Combustion and Novosibirsk State University. The aim of the Conference is to bring together scientists dealing with nitroxide radicals and EPR and to stimulate interchange of ideas and opinions, thus providing mutual benefits and further progress in the field. All participants are supposed not only to present exciting sci-

entific results, but also to learn about the latest advances in the related areas. SPIN-2005 will cover all aspects of chemistry and applications of nitroxide radicals.

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High Field / High Frequency ESR/EPR Workshop

The Center for Advanced ESR Technology (ACERT) at
Cornell University, Ithaca, USA
November 4–6, 2005

The High-Field ESR 2005 workshop will present a cross-section of practical techniques and hands-on experience for participants who wish to explore what advantages HFHF ESR can offer for studying biological and other systems. Topics will include: instrumentation, sample preparation, data collection and spectral analysis. Invited speakers will present talks designed to highlight recent progress in these areas and promote discussion of current needs.

Workshop participants will have an opportunity to learn how to operate spectrometers at 95 GHz (pulsed and cw), 170 and 250 GHz under the guidance of experienced center staff.

For more information concerning cost, accommodations, and local amenities, please contact Joanne Trutko: jkt27@cornell.edu

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4th Asia-Pacific EPR/ESR Symposium (APES'04)

Bangalore, India

November 22–25, 2004

The 4th Asia-Pacific EPR/ESR symposium was held in the period from November 21 till 25, 2004, at Bangalore, India. It was a wonderful experience to participate in an EPR symposium, at a place, which paved the beginning and development of EPR research in India. The symposium was hosted by the Indian Institute of Science and the Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore.

Some history of the city and the institute: Bangalore is the capital city of Karnataka state, one of the south Indian states. Bangalore was founded by the great Vijayanagara Empire in the 14th century AD. Archeological remains of the great empires Hoysala (10–14 century AD) and Vijayanagara (14–15 century AD), scattered across the state, are the best preserved examples of ancient Indian architecture. We had a short trip to the temples of Belur, Halebid and Sravenbelgola that are situated around 250 km away from Bangalore. The temples of Belur and Hale-



Belur Channa Keshava Temple, with the temple entrance gate (Raja Gopuram) in the background

bid were built by the Hoysala King Vishnuvardhana in 1117 AD to commemorate his conversion from Jainism to qualified non-dualism by Sri Ramanuja, a great philosopher. Sravenbelgola is a Jainist shrine, belonging to the pre-Hoysala period (983 AD), hosting the 18 meter monolithic statue of Gomateshwara, a Jain monk. Bangalore as a city was created by the later Gowda rulers in 1537. Later in the 18th century, it came under the rule of Hyder Ali and Tipu Sultan. When Tipu Sultan died in the 4th Mysore war in 1799, the British gave the kingdom, including Bangalore, back to Krishna Raja Wodeyar III. After the independence of India in 1947 and after the Karnataka state was formed, the headquarters of the state government were shifted to Bangalore. It is popularly known as the Garden city of India. Beautiful weather, sunshine, and chilly mornings are specialty of Bangalore. Bangalore is not only famous for the scenic beauty but also hosted a number of well-known scientists of the country, including Sir C. V. Raman, H. J. Bhabha, Vikram S. Sarabhai, J. C. Ghosh, S. Bhagavantam, C. N. R. Rao. In 1909, the great visionary Jamsetji Nusserwanji Tata, with the help of the British Viceroy and the king of Mysore, Krishna Raja Wodeyar IV, founded the Indian Institute of Science, which became one of the best institutes for science and technology in the country. EPR research in the institute started in 1951, with a homebuilt spectrometer.

The organizers, of the symposium, Prof. Rudowicz, Prof. Bhat, and Prof. Ohta, with

their local organizing committee constituting the students and faculty members from the Department of Physics, made wonderful arrangements for the scientific and cultural programs. There was a welcome reception for the participants, at the institute guest-house on 21st evening, which served Banglourian specialties. The scientific program of the symposium started on November 22nd morning after the welcome addresses by Prof. Bhat, Prof. Rudowicz and Prof. Tsvetkov. The first plenary lecture was given by Prof. Schweiger, ETH, Zürich, who talked about new strategies and applications in CW and pulse EPR. This was followed by the lectures of Prof. Rudowicz, on EPR of high-spin nanomagnets and Prof. Tsvetkov, on PELDOR in peptaibol antibiotics. There were several invited lectures and research contributions on different and vast levels of EPR spectroscopy, metal complexes, biological systems, materials, spin labels and methodology developments, earth and environmental sciences, software development, geological applications, applications to nanomagnets, glasses and new developments in cross-disciplinary areas, etc. All sessions were organized in two parallel sessions, one for physics and materials science, another one for chemistry and applications in biological science. There were two poster sessions on November 22nd and 23rd afternoons.

There was a long list of pioneering EPR scientists as invited speakers viz., Prof. W. E. Trommer (Germany), Prof. T. Takui (Japan),



Sravenbelgola Jain Temple hosting the 18 meter monolithic statue of Saint Gomateshwara

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Prof. T. Endo (Japan), Prof. K. Endo (Japan), Prof. G. Hanson (Australia), Prof. J. R. Pilbrow (Australia), Prof. L. Berliner (USA), Prof. E. Giamello (Italy), Prof. J. Krzystek (USA), Prof. E. G. Bagryanskaya (Russia), Prof. K. P. Mishra (India), Prof. S. Yamauchi (Japan), Prof. P. T. Manoharan (India), Prof. K. P. Dinse (Germany), Prof. Yong Li (China), to name a few. There were two in-focus sessions in "EPR in Rare-Earth Manganites" and "Non-Resonant Microwave Absorption Studies in High Temperature Superconductors".

On 23rd evening there was a performance of "Yakshagana" a traditional theater art, which is popular in the Karnataka state. It is a ballet cum drama, narrating the stories from the great epics of India. 24th afternoon there was a special session by Bruker BioSpin, on the recent developments in EPR



One of the most famous carvings, at Belur Channa Keshava Temple; Lord Vishnu, in the form of a Damsel, a Pillar inside the sanctum sanctorum

instrumentation. This was followed by a hectic city tour (Bangalore is one of the most crowded cities in India), which covered the magnificent government assembly building, called Vidhan Soudha, the Bull temple, and the famous ISKCON temple. After the city tour, there was a banquet dinner. The symposium was an event to elect the new members and office bearers of the Asia Pacific EPR/ESR society. The symposium was concluded on 25th afternoon. It was a memorable event, four days of didactic and cultural exchange. All in all we think that the symposium was a success, and the community is eagerly looking for the next meeting of the Society.

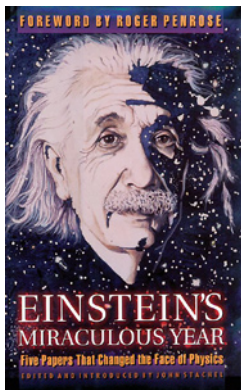
Sreekanth Anandaram
EPR@ETH, Zürich

This column is a special one. It is devoted to Albert Einstein and the “Annus Mirabilis” we celebrate this year (see also the Editorial). A number of books, describing different aspects of Einstein’s personality and a movie will be presented and briefly reviewed. For audio-recordings of Einstein, the reader is referred to the *EPR newsletter* 14/1-2, p. 28.

The scientist

Einstein’s Miraculous Year

Edited and introduced by John Stachel
Princeton University Press, March 30, 1998
Price: \$ 26.50
Hardcover: 208 pages



This book collects the five seminal papers of 1905 (in English), all published in “Annalen der Physik”. It is convenient to have these papers, which changed the world view of physics so dramatically, combined in a single volume, together with comments about the work.

From the editorial review:

This volume consists of translations of Einstein’s revolutionary papers that year, with introductions by physicist Roger Penrose and others that explain why these papers are among the most important scientific documents of this century – if not all time. As a group they are notable for bridging mechanical theories of physics – particles whizzing around – and the relativistic view.

Have a look inside this book:

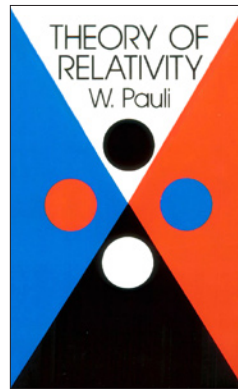
eprnl.org/15-1/miraculous

Theory of Relativity

by Wolfgang Pauli
Dover Publications, September 1, 1981
Price: \$ 9
Paperback: 255 pages

When great meets great... In this book a young graduate student who just got his

doctor’s degree and who became one of the greatest physicist of the 20th century has written this book at the age of 21 to explain us relativity theory. Einstein was enthusias-



tic about this text. The work was originally published in German in “Encyklopädie der mathematischen Wissenschaften, vol. V19” with the title “Relativitätstheorie”.

From the editorial review:

This classic work offers a concise and comprehensive review of the literature on relativity as of 1921, along with the author’s insightful update of later developments in relativity theory and coverage of the controversial questions that arose. Special attention is given to unified field theories.

Have a look inside this book:

eprnl.org/15-1/relativity2

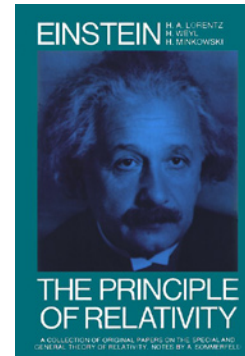
Principle of Relativity

by Albert Einstein
Dover Publications, June 1, 1924
Price: \$ 8
Paperback: 216 pages

In this book the Maestro himself explains us, supported by famous colleagues like Lorentz, Minkowski, and others, what is special and general relativity all about.

A reviewer writes:

The book is a chronology of the development of the theory of Relativity. Starting with Lorentz’ papers on Michelson’s interference experiment and electromagnetic phenomena in moving frames of reference, the book follows the rapid development of the



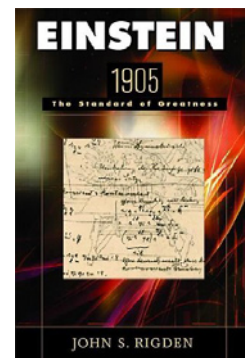
subject from Einstein’s ground breaking papers of 1905 on Electrodynamics and Inertia. Minkowski’s original paper on Space-Time is a delight: it’s always a pleasant surprise when one finds that the explanation of the originator has not been bettered in nearly 100 years! (Jay Jina)

Have a look inside this book:

eprnl.org/15-1/relativity1

Einstein 1905: the Standard of Greatness

by John S. Rigden
Harvard University Press, January 15, 2005
Price: \$ 15
Hardcover: 192 pages



From the product description:

For Albert Einstein, 1905 was a remarkable year. This unparalleled period is the subject of John Rigden’s book, which deftly explains what distinguishes 1905 from all other years in the annals of science, and elevates Einstein above all other scientists of the twentieth century. Rigden chronicles the momentous theories that Einstein put forth beginning in

March 1905. To help readers understand how these ideas continued to develop, he briefly describes Einstein's post 1905 contributions, including the general theory of relativity.

Rereading Einstein on Radiation

by D. Kleppner

Physics Today 58, 30 (2005)

The author writes:

The concepts of spontaneous and stimulated emission are well known from Einstein's 1917 paper on radiation, but his theory of radiation comprises other concepts – the paper is a treasure trove of physics.

Einstein's Legacy

Science 307, no. 5711, 866–890 (2005)

Science celebrates the 2005 World Year of Physics that honors Einstein's achievements with a special section focusing on some of the challenges that remain in physics.

Contents:

- Special Relativity Reconsidered
- We're So Sorry, Uncle Albert
- The Quantum Measurement Problem
- From Pedigree Cats to Fluffy-Bunnies
- Time and the Quantum: Erasing the Past and Impacting the Future
- Astrophysical Observations: Lensing and Eclipsing Einstein's Theories
- Inflationary Cosmology: Exploring the Universe from the Smallest to the Largest Scales

The philosopher

Einstein and Buddha: the Parallel Sayings

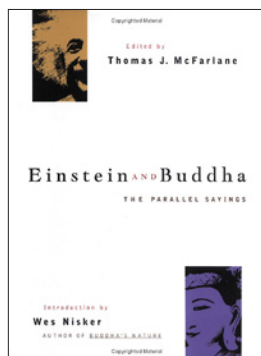
by Thomas J. McFarlane and Wes Nisker
Ulysses Press, September 9, 2001

Price: \$ 13

Hardcover: 220 pages

From a review:

The over 120 parallels, each matching a modern physicist and an Eastern mystic, are a collection of startling clues that hint at a deeper relationship between science and religion. Statements by Einstein, Bohr, Heisenberg, Schrödinger, and other founders of modern physics are paired with remarkably similar statements by Buddha, Shankara, Chuang



Tzu, and other Eastern mystics. This book shows you the surprising parallel statements of the physicists and mystics, grouped into a variety of themes, and lets you ponder their significance for yourself.

Have a look inside this book:

eprnl.org/15-1/buddha

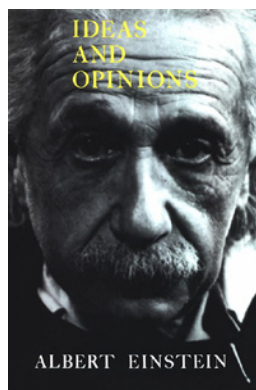
Ideas & Opinions

by Albert Einstein

Gramercy; Reprint edition, December 12, 1988

Price: \$ 5.40

Hardcover: 384 pages



From a review:

Einstein wasn't just a scientist, but a general genius and philosopher. This book offers wonderful insight into one of the greatest minds of the century, if not all time. The book is a compilation of letters, essays and writings on all sorts of topics. He speaks about his thoughts on America, the world, life.

Contents:

- Ideas and Opinions
- About Freedom
- About Religion
- About Education
- About Friends

- On Politics, Government and Pacifism
- On the Jewish People
- On Germany
- Contributions to Science

Have a look inside this book:

eprnl.org/15-1/opinions

The humanist

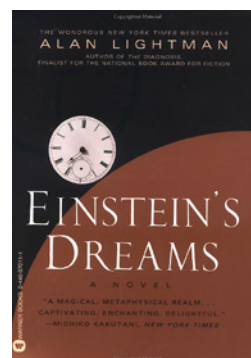
Einstein's Dreams

by Alan Lightman

Warner Books; Reprint edition, February 1, 1994

Price: \$ 9.60

Paperback: 179 pages



Einstein's Dreams became a bestseller by delighting both scientists and humanists. It is technically a novel. Lightman uses simple, lyrical, and literal details to locate Einstein precisely in a place and time – Berne, Switzerland, spring 1905, when he was a patent clerk privately working on his bizarre, unheard-of theory of relativity. The town he perceives is vividly described, but the waking Einstein is a bit player in this drama.

Have a look inside this book:

eprnl.org/15-1/dreams

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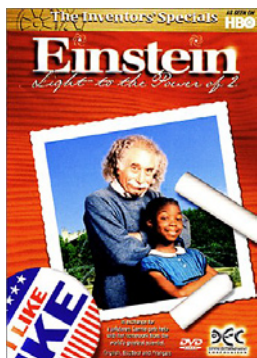
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Einstein: Light to the Power of 2

Movie, DVD (2000)

Director: David Devine

Price: \$ 10



From the editorial review:

The family-oriented film finds Einstein (Paul Soles) as a scholar and physicist at Princeton University. He befriends Lannie (Lataye Studwood), a 12-year-old African American, whose mother works at the university and whose father is an aspiring singer. Einstein offers to tutor Lannie, who's being shoved into a remedial class. Themes explored are intellectual freedom, racism, stereotypes, friendships, family, loyalty, and love.

★ QUIZ WINNER ★ QUIZ WINNER ★

Our quiz of EPR newsletter 14/1-2

We are glad to announce the version of the dialog between Niels Bohr and Wolfgang Pauli (versions were published in the *EPR newsletter* 14/3, p.28) which got the maximum votes:



Niels Bohr: Wolfgang, do we need the Pauli's principle to describe how this thing moves?

Wolfgang Pauli: No, Niels, we even do not need Bohr's principles here.

The winner is **Arnold Raitsimring** (University of Arizona, Tucson). He will get a nice tippe top

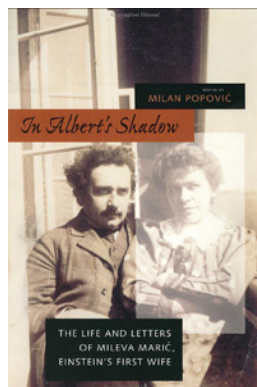
The human being

In Albert's Shadow: The Life and Letters of Mileva Maric, Einstein's First Wife

by Mileva Einstein-Maric and Milan Popovic
Johns Hopkins University Press, November 1, 2003

Price: \$ 15.70

Hardcover: 192 pages



From the editorial review:

Albert Einstein's first wife Mileva was a promising physicist in her own right and certainly aided him, in one shape or another, in the development of some of his most famous work. This volume contains sixty-five letters she wrote to her friend Helene Savic (the grandmother of the editor) from 1899 to 1932, including a number of added notes by Albert. Also included is a brief biographical essay.

Have a look inside this book:

eprnl.org/15-1/life

★ QUIZ WINNER ★ QUIZ WINNER ★

Our quiz of EPR newsletter 14/3

The Photo of the Issue (*EPR newsletter* 14/3, p. 20) was taken in the course of a public lecture on the Physics of Music given by Erwin Hahn. He was demonstrating cavity resonances by drumming his head (take note of the brass Helmholtz resonator on the table in front of him, next to a tuning fork). A singer shifts these broad resonances about by flexing oral and connected head cavity volumes and shape (without the sticks) that resonantly emphasize groups of tones and overtone frequencies (called formants) produced by the vocal chords.

The quiz was to tell what kind of sound the microphone records. Till the deadline March 30, we got only one e-mail message with two versions. We have chosen:

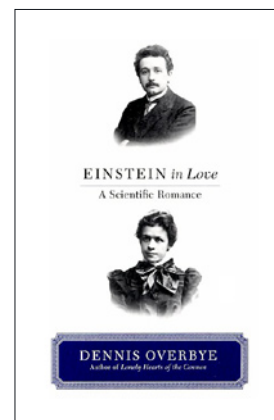
Einstein in Love: a Scientific Romance

by Dennis Overbye

Penguin, October 1, 2001

Price: \$ 11

Paperback: 432 pages



From the product description:

In *Einstein in Love*, Dennis Overbye has written the first profile of the great scientist to focus exclusively on his early adulthood, when his major discoveries were made. It reveals Einstein to be very much a young man of his time—draft dodger, self-styled bohemian, poet, violinist, and cocky, charismatic genius who left personal and professional chaos in his wake. Drawing upon hundreds of unpublished letters and a decade of research, *Einstein in Love* is a penetrating portrait of the modern era's most influential thinker.

Have a look inside this book:

eprnl.org/15-1/romance



Erwin Hahn has just said: "Now, if I hit on the left, then twice as hard on the right, you should hear an echo".

The winner is **David J. Lurie** (University of Aberdeen, Scotland, UK). He will get this photograph signed by Erwin Hahn.

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The Ohio State University is an equal opportunity/affirmative action employer. Qualified women, minorities, Vietnam era veterans and individuals with disabilities are encouraged to apply.

Send CV to: Dr. Jay Zweier, 473 West 12th Avenue, Room 110, Columbus, Ohio 43210 or zweier-1@medctr.osu.edu.

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Gareth R. Eaton geaton@du.edu

Available: Isotope-Containing Spin Probes

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For SWAP: Fast Digitizers EG&G 9825-200

We have two EG&G 9825-200 fast digitizers (EG&G instruments is now part of AMETEK Signal Recovery; the 9825 is not a current product). These 8-bit (16-bit sum) digitizers can sample up to 200 MS/s. They have a 2-board PC-AT card format. There is an external preamplifier, and software for a PC. We have replaced the EG&G digitizers with Bruker SpecJet digitizers in our saturation-recovery spectrometers, where we used the 9825 digitizers for several years. They were in good operating order when we removed them from service recently. We would be will-

ing to swap the EG&G digitizers for something more immediately useful to us. When they were new, the list price was ca. \$ 10K for each of the two digitizers. If you are interested, please discuss possibilities with us.

Gareth R. Eaton geaton@du.edu

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Please contact: James Anderson, Research Specialties, janderson36@wi.rr.com

1030 S. Main St., Cedar Grove, WI 53013, USA. Phone/fax: 1-920-668-9905

Dear Laila,

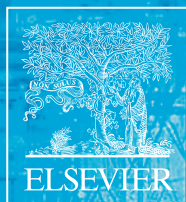
In 2007, the EPR community will celebrate the 100th birthday of E. K. Zavoisky, the founder of electron paramagnetic reso-

nance. To mark this event, we plan to prepare a special issue of *Applied Magnetic Resonance* (www.springer.at/amr) with an emphasis on the modern development of EPR. I would like EPR spectroscopists to consider the possibility to submit their papers to this issue.

As the first step, those who are interested to participate in this activity are kind-

ly invited to send to the Editorial Office (applmr@kfti.knc.ru) an e-mail message with a tentative title of their paper. Deadline for suggestions of tentative titles is April 30, 2006.

Kev Salikhov
Editor-in-Chief of
Applied Magnetic Resonance
salikhov@kfti.knc.ru



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E-mail: a.gent@elsevier.com

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TOP 5 HIGHLY-CITED ARTICLES OVER LAST 3 YEARS:

- M. Bak, J.T. Rasmussen, N.Chr. Nielsen, “**SIMPSON: A general simulation program for solid-state NMR spectroscopy**”,
J. Magn. Reson. 147 (2000) 296-330
- I. Schnell, H.W. Spiess, “**High-resolution 1H NMR spectroscopy in the solid state: Very fast sample rotation and multiple-quantum coherences**”,
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