

## Obituary for SPS Member Markus Büttiker

On October 4, 2013, Markus Büttiker passed away, only 63 years old. With him the scientific community of Geneva, of Switzerland, and the world of solid state physics, lost one of the most remarkable representatives of the trade. His memory was evoked at a very well attended gathering on October 15, where several speakers told about reminiscences of Markus.



Markus was born in 1950, the oldest of 8 children, in Wolfwil (Switzerland). In 1974 he obtained his diploma with Professor Baltensberger at the ETHZ. After that, he went on to study for a PhD in Theoretical Physics with Professor Thomas in Basel. Markus finished his PhD in 1978, and the subject was "Dynamical aspects in voltage-controlled current instabilities." After a short post-doc in Basel, he moved to IBM Yorktown

Heights, where he stayed until his move to the University of Geneva in 1994. Now his life changed from the comfort of IBM to the realities of a Swiss University, a transition he easily adapted to. He took all the duties of a full professor with dedication and care for detail, and was an appreciated teacher for undergraduates. He also acted as head of the theory department for almost 10 years, from 1998 to 2007.

During the last few years, it transpired that he had some problems with his health, cancer, as became clear to everybody only in the last weeks of his life. While he never shared his hopes or worries with his friends and colleagues, he was happy to see each one a last time, as he understood that the end was near. He left all of us, and his wife Michelle, while maintaining a state of serenity and rationality to very end.

His untimely death leaves all of us not only with sorrow, but also with many good reminiscences.

As a scientist, he leaves a legacy of discoveries which have changed the way in which people look at the electronic properties of materials at the nano-scale, many of which have become fundamental textbook subjects. The most outstanding and far-reaching of these is the development and application of scattering theory to a huge variety of different electronic transport phenomena. For his research, Markus Büttiker received two "Technical Achievement Awards" from IBM and in 1990 became "Fellow of the American Physical Society".

One of the strengths of Markus work is the clarity of his exposition combined with the depth of his insights, qualities which make reading his work a pleasure. That was indeed the scientific power of Markus: go to the essence of a problem. With simplicity and elegance, connect basic concepts to quantities that one can measure, without

un-necessary technicalities. He certainly was a master in making clear-cut predictions while developing physical intuition. That, in its essence, is what physics is about. This all happened as a quite new field was starting and Markus was laying the foundations, developing ideas that would be used over and over again.

One of us (AM) has experienced this as a young scientist starting his PhD at the Scuola Normale in Pisa. Having to learn everything from scratch--studying the existing literature step by step--"meeting" for the first time Markus was an eye-opener. Through a streak of his papers dealing with a specific problem one could rapidly learn many of the difficult concepts that were often mentioned in other papers, but that were not clear before. Suddenly, after reading and thinking about some of Markus' papers, many logical steps would become clear, in a way that seemed entirely obvious, with everything falling into place. The rewarding feeling from this experience has remained very vivid throughout all these years.

Another legacy of Markus is his school. Through persistence and care, he was able to attract exceptional students and postdocs who would learn from his way of approaching problems. He supervised about 10 graduate students, and interacted fruitfully with a much larger number of postdoctoral fellows. This became in fact the important part of his activities while in Geneva. The regular coffees (at 10 o'clock) were an integral part of his method of interacting with the group. Everybody admired the earnestness of his approach in these discussions, but also in seminars, with remarks that were always interesting and to the point. These principles of research fan out and survive him in the successful careers of those who have been in contact with him.

While he would appear as somewhat reserved, on getting to know him better, he would come across as an interested, and open person, who would always listen and share his insights. This would not only include his theoretician colleagues, but even more so, he liked to help his experimentalist colleagues.

Until the very end, Markus wanted to look forward, even when he knew that not much time was left: He was very happy that he got his Fonds National Grant, and, of course even more so that he was awarded in summer 2013 an ERC Advanced Grant, with the perspective of being able to do scientific work in a group beyond retirement. He impressed those who visited him a last time with his care for leaving plans of doing the best for each member of his group. Probably, this is the message that he really wanted to leave us, and in particular the younger ones: always look forward and never give up your plans. If one follows this idea, then his teaching achievements will remain long beyond his untimely death.

We will keep a fond memory of a friend and a brilliant colleague.

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