

# FEL Prize

The International Free Electron Laser Prize is awarded each year to recognize individual researchers for their outstanding contribution to the field. At the 26<sup>th</sup> International Free Electron Laser Conference the prize for 2004 was awarded to Hiroyuki Hama (Tohoku University) and Vladimir Litvinenko (Brookhaven National Laboratory), in recognition of their fundamental and pioneering contributions to Storage Ring Free Electron Lasers (SRFELs).



*Hiroyuki Hama (left) and Vladimir Litvinenko (right) receiving the 2004 FEL Prize from the FEL Prize Committee Chairman, Stephen Benson (centre)*

Vladimir Litvinenko and Hiroyuki Hama have performed fundamental and pioneering contributions in Storage Ring Free Electron Lasers (SRFELs). Thanks to their deep understanding of the FEL and to their achievements, they have promoted the use of SRFELs in a broad scientific community, from synchrotron radiation to nuclear physics.

They have both worked innovatively at the frontiers of SRFELs. V. Litvinenko installed the electromagnetic optical klystron OK4 on the by-pass of VEPP3 at Akadiemgorodok (Russia) in 1988, and H. Hama installed the first optical klystron with adjustable planar-to-helical field in 1996 on UVSOR in Okazaki (Japan). These improvements produced new short wavelength records for FELs: 240 nm for VEPP3 SRFEL in 1988, 238 nm for the UVSOR SRFEL in 1996. Then, after a move by Litvinenko to Duke University, 226 nm in 1998, and to 193 nm in 1999.

They have both been very active in advancing the understanding of storage ring FEL dynamics, H. Hama performed very early systematic sophisticated experimental analysis of the FEL micro-pulse temporal and spectral distribution versus time for different operating conditions starting in 1994. He also carried out detailed studies on FEL performances for different momentum compaction factors. V. Litvinenko developed a complete theoretical model of giant and super pulses whose findings are in good agreement with measurements performed on the DUKE FEL, and used super pulses to produce strong coherent harmonics.

They have developed technological improvements to SRFELs that improve the device for users. Hama developed a feedback system to maintain the FEL pulse at perfect synchronism, leading successful pump-probe two-color experiments in gas phase using FEL light and synchrotron radiation for the first time. A transverse feedback system was developed in Duke FEL to stabilize beam operation.

A very important contribution of their work has been the production of monochromatic gamma-rays by Compton Back-Scattering with SRFELs. Hama performed the first experimental demonstration at UVSOR

in 1996 in the MeV range. At Duke University, Litvinenko developed a high intensity gamma ray user facility (HIGS), leading to new discoveries in Nuclear Resonant Fluorescence and near-threshold break-up of Deuterium. This has broadened the use of FELs into the field of nuclear physics.

Besides their leading role in FELs, they continue to make important contributions to the field of physics as a whole. They have trained many graduate students and have assisted in the commissioning of numerous synchrotron light sources. Both operated FEL user facilities providing hundreds of hours of FEL light to users each year. Litvinenko is now working on electron-ion colliders. Hama is involved in the design of the next generation of storage rings in Japan.

*The FEL Prize Committee*

## **Previous FEL Prize Winners**

- 2004** (Trieste) Vladimir Litvinenko and Hiroyuki Hama
- 2003** (Tsukuba) Li-Hua Yu
- 2002** (Argonne) H. Alan Schwettman and Alexander F.G. van der Meer
- 2001** (Darmstadt) Michel Billardon, Marie-Emmanuelle Couprie, and Jean-Michel Ortega
- 2000** (Durham) Stephen V. Benson, Eisuke J. Minehara, and George R. Neil
- 1999** (Hamburg) Claudio Pellegrini
- 1998** (Williamsburg) John Walsh
- 1997** (Beijing) Kwang-Je Kim
- 1996** (Rome) Charles Brau
- 1995** (New York) Richard Pantell and George Bekefi
- 1994** (Stanford) Alberto Renieri and Giuseppe Dattoli
- 1993** (The Hague) Roger Warren
- 1992** (Kobe) Robert Phillips
- 1991** (Santa Fe) Phillip Sprangle and Nikolai Vinokurov
- 1990** (Paris) Todd Smith and Luis Elias
- 1989** (Naples, FL) William Colson
- 1988** (Jerusalem) John Madey