X-Ray Free Electron Laser

Japan launched an X-ray Free Electron Laser Facility construction project in the 2006 fiscal year (FY), as one of the “Key Technologies of National Importance” in its 3rd Science & Technology Basic Plan. A committee for promoting photon science held in FY 2004 at the MEXT (Ministry of Education, Culture, Sports, Science and Technology) published a report pointing out the importance of “short-wavelength coherent radiation.” This could be partly due to the astonishing results obtained with coherent x-rays at the 1 km beamline of SPring-8.

RIKEN had been making an R&D program on “elements development for X-ray Free Electron Laser (XFEL)” when the report was published. They proposed 8 GeV linac-based self-amplified spontaneous emission (SASE) XFEL to generate < 0.1 nm wavelength coherent radiation. The construction of 250 MeV linac-based prototype FEL to generate 50-60 nm extreme ultraviolet laser was approved in FY 2005, which led to the first laser in June 2006. Unique technologies adopted to the Japanese XFEL, such as a DC electron gun, a velocity bunching system, C-band accelerators and in-vacuum undulators, worked perfectly. The experiences accumulated in the prototype construction facilitated the detailed design of 8 GeV XFEL which will be the one and only XFEL co-located with a 3rd generation X-ray SR source.

Official XFEL project website (in Japanese) : http://www.harima.riken.jp/xfel/ (The English official site is in preparation.)
Also visit http://www.xfel.spring8.or.jp/ for accelerator development.