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Title : Collective spontaneous emission (superfluorescence) observed at the SCSS EUV free-electron laser

Abstract:

With the LCLS (2009, US), SACLA (2011, Japan) and the European XFEL (201?, Germany), ultra-short light pulses with unprecedented levels of intensity and coherence in the x-ray wavelength region are becoming available, and around the world new areas of research are opening up. In this talk I will present recent results from the SCSS EUV free-electron laser, where we have demonstrated superfluorescence in helium gas. Superfluorescence is an example of a quantum optical collective phenomenon, and our work represents one of the first extensions of effects which are commonplace with visible-light lasers to shorter and shorter wavelengths. The work may also suggest ways of overcoming some of the disadvantages of lightsources which rely on the SASE process, which leads to the characteristic 'spiky' profiles in wavelength and time. I will also present other recent and related results, along with future prospects.