EUVL R&D Status - Europe

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UCD update

- Collaborations
  - Dublin City University – LPP diagnostics
  - Trinity College Dublin – DPP enhancement
- ≈ 30 researchers incl. 12 PhD students
- Successful mid-term review by SFI
- Liquid optic for EUV under development
- CO_2/Nd:YAG dual pulse studies.
- 6.5 nm work with Utsunomiya & Waseda Universities

What, Where?

- Ireland
  - UCD – LPP source development, diagnostics, spectroscopy & modelling. Liquid optics for EUV, HHG in laser plasmas. DPP studies
  - DCU – LPP source diagnostics
  - TCD – DPP studies, Magnetic stabilisation of LPP
- Switzerland
  - ETZ (Zurich) – Sn LPP source, Debris
  - Adlyte – LPP for metrology
  - Paul Scherrer Institute – Interference Lithography, making 12nm patterns.
- Italy
  - University of L'Aquila & ENEA – DPP Sources, Kr gas XUV laser – Interference Lithography
  - Media Lario – collector optics
  - ENEA Frascati – EUV encryption

What, Where?

- France
  - CEA-LETI – Resist outgasing, Mask, Interferometry
  - CNRS – Mask, Resist
  - EPPRA – Metrology source & Z* modelling
- Germany
  - PTB, Berlin Germany – Mask, multilayer
  - RWTH & Fraunhoffer– DPP, Laser Development, Collectors, Optics
  - Carl Zeiss – Optics, multilayers
  - Ushio Extreme DPP source to IMEC
- Belgium
  - IMEC – Resist, Metrology

What, Where?

- The Netherlands
  - Delft –Mask, contamination studies
  - TU Eindhoven – Debris, Optics?
  - FOM –Optics, Multilayers and ML damage studies at FLASH, Photon & Ion interactions with MLs, Metrology
  - ASML
- Czech Republic
  - CTU Prague – Czech Rep. – Optics
  - EUV LIBs
- Spain
  - Madrid, UCM – EUV plasma code development

What, Where?

- Russia
  - ISAN– Spectroscopy & Diagnostic Instrumentation, Debris Studies, DPP sources
  - Keldysh Institute – Spectroscopy Plasma Modelling
  - TRINITI – Source Concepts
- Poland
  - MUT, Warsaw - EUV source development – gas puff
  - EUV materials treatment
  - EUV nanostructuring
- Sweden
  - KTH, Sweden – N_2 LPP droplet source – Water Window

COST Action MP0601

- Final Meeting – Paris November 2011
- Much work on EUV sources outside 13.5 nm
- Coherent & incoherent
- Materials Science, imaging, microscopy, Cultural Heritage Studies
- Sources:
  - Discharge-produced Plasmas
  - Laser-produced Plasmas
  - X-ray Laser
  - High Harmonic Generation
  - X-ray Tubes