

**THE LDM BEAMLINe AT FERMI@ELETTRA**

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*Abstract*

The Low Density Matter beamline (LDM) at FERMI@Elettra is scheduled to begin operation in early 2011 as a large collaborative project for experiments on neutral matter beams, and later on trapped species and mass selected ions. FERMI@Elettra is a seeded source comprising two Free Electron Lasers (FELs) that will generate short pulses (25–200 fs) of VUV (FEL1: 12–60 eV) and XUV/soft-X-rays (FEL2: 60–300 eV; third harmonic: up to 900 eV) with close-to-transform-limited transverse and longitudinal coherence, and full polarization control. It includes a synchronized broadly-tunable user laser for pump-probe experiments. LDM modular design seeks to exploit these unique features with a flexible choice of target system and detection method. It will supply intense beams of neutral atoms, closed-shell molecules, radicals, and pure/doped clusters (the latter ranging from ultracold helium nanodroplets, to atomic and molecular van der Waals clusters, especially water, to clusters of refractory materials such as metals and their oxides). These can be combined with a set of detectors, working in tandem when possible, for photoelectron/photoion spectroscopy, fluorescence emission, and photon scattering.

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