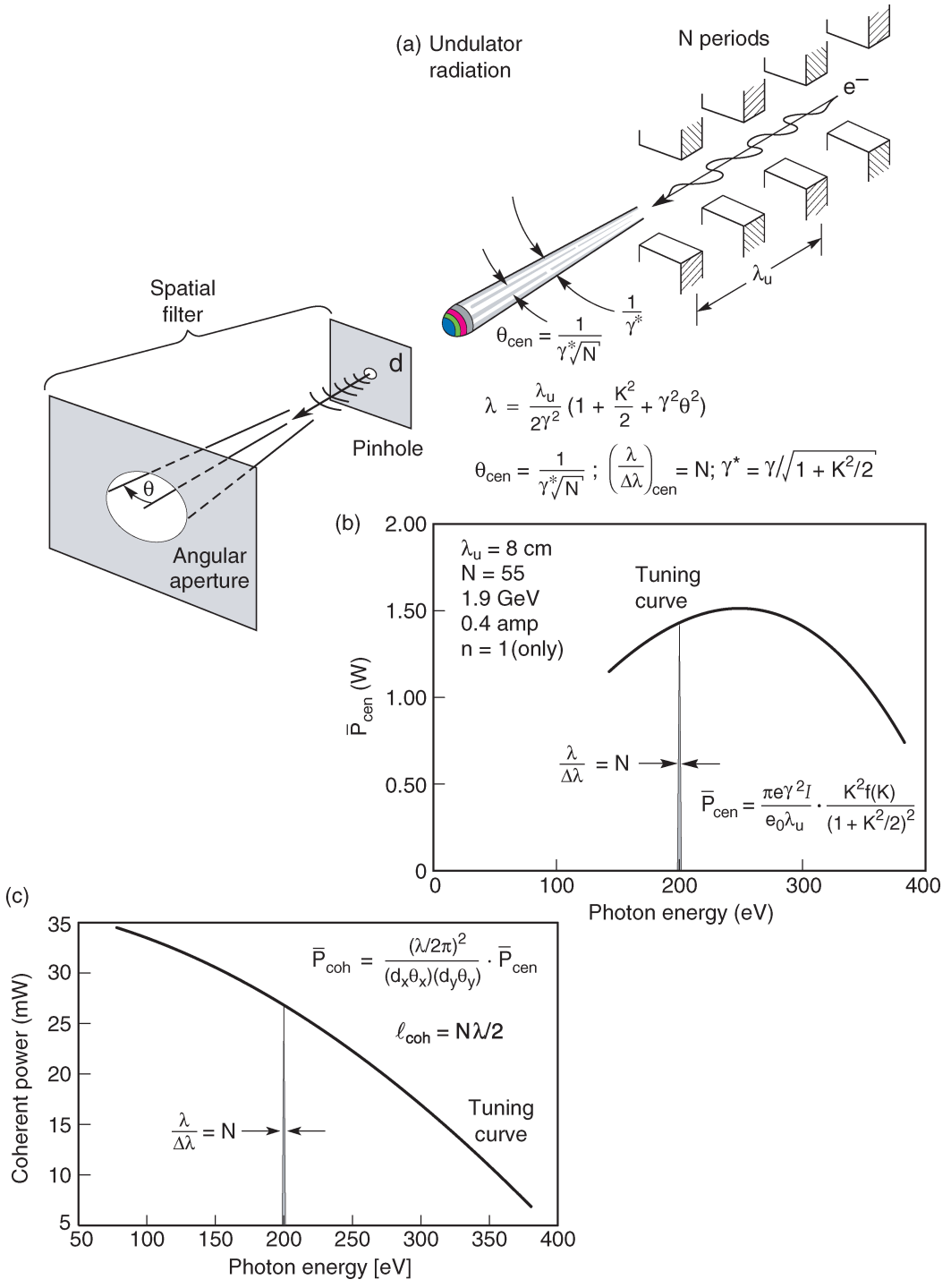
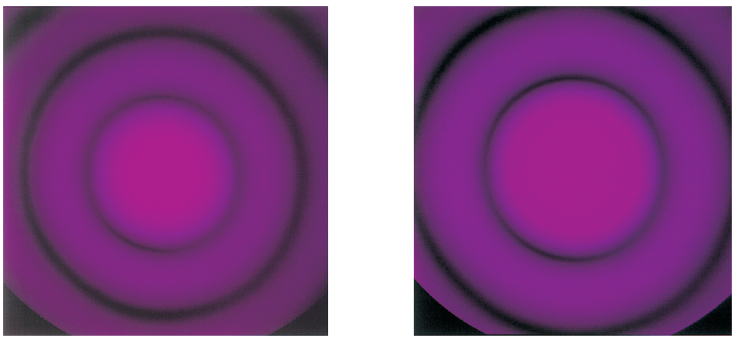
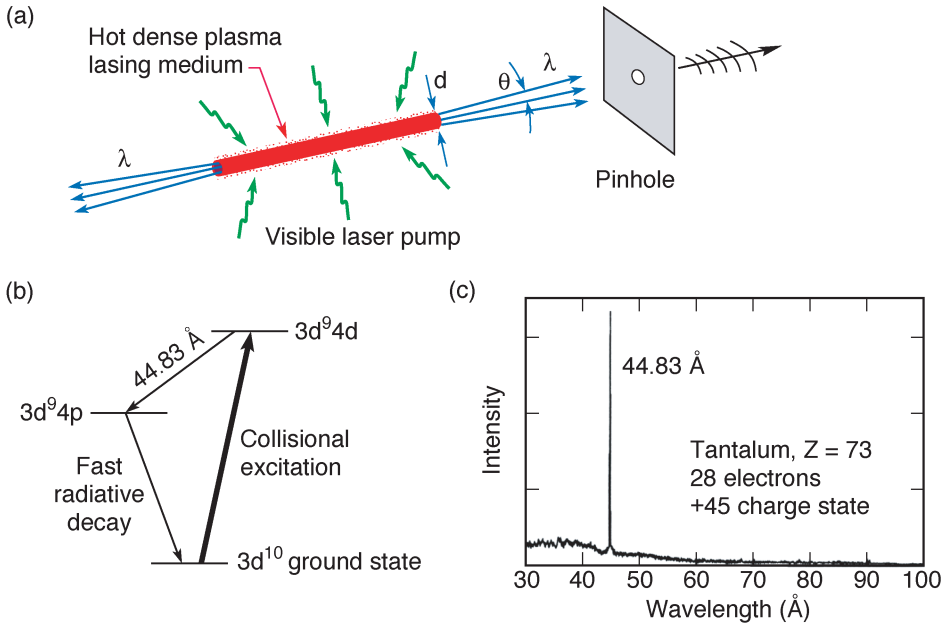


COLORPLATE X. (a) Undulator radiation with a pinhole spatial filter. (b) Power in the central radiation cone (θ_{cen}, $1/N$ relative spectral bandwidth) for an 8 cm period undulator at the Advanced Light Source (ALS) at Lawrence Berkeley National Laboratory. (c) Time-averaged coherent power after spatial filtering ($d \cdot \theta = \lambda/2\pi$). See text, p. 311.



COLORPLATE XI. Far-field images (Airy patterns) of spatially filtered undulator radiation at wavelengths of 11.2 nm and 13.4 nm. Wavelength tuning is accomplished through variation of the magnetic field, and thus K, for an 8 cm period undulator at the Advanced Light Source. The beamline and pinhole spatial filter are illustrated in Colorplate X and discussed in the text. A 1.1 μm diameter pinhole was used, and the monochromator was set for a relative spectral bandwidth of 1/1100. The measured power in the central Airy disk is 11 μW at 13.4 nm wavelength. Radiation within the central Airy disk is used for spatially coherent experimentation. (Courtesy of P. Naulleau and colleagues, LBNL.) See text, p. 318.



COLORPLATE XII. Soft x-ray lasing is demonstrated on a 4d to 4p (J = 0 to 1) transition at 4.483 nm wavelength (276.6 eV) in nickel-like tantalum atoms (Z = 73, 28 electrons, +45 charge state). The highly stripped atoms are created and collisionally pumped in a hot dense laser plasma created by a high power 250 psec pulse duration terawatt laser pulse. A multimode 100 kW pulse is produced in both directions at 4.483 nm wavelength. Spatial filtering to a single transverse mode would yield a 20 mW pulse of spatially coherent radiation with a 25-μm longitudinal coherence length. (Courtesy of B. MacGowan and colleagues, LLNL.) See text, p. 320.