## 4. PRODUCTION AND PROPERTIES OF RADIATIONS

Table 4.2.1.7. *Intensity gain with storage rings over conventional sources; from Farge & Duke (1979), courtesy of ESF*

	GX6 rotating-anode tube 2.4 kW (Cu Kα emission)	DCI 1.72 GeV and 240 mA	ESRF 5 GeV and 565 mA
Small-angle scattering with a double monochromator		×500 to 1000	×15000 to 3000
Protein crystallography with a single-focus monochromator 1 mm³ samples Small samples		×50 to 160 ×30 to 60	×900 to 1800 ×650 to 1300
Diffuse scattering (wide angles, low resolution and large samples) with a curved graphite monochromator		×20 to 40	×160 to 320
Non characteristic wavelength (continuous background) EXAFS experimental set-up with a 100 kW rotating anode		$\times 10^4$	$\times 10^5$

(Left margin: Brightness impact)
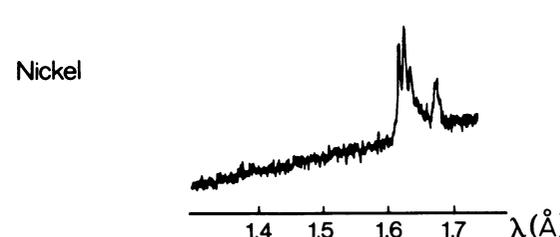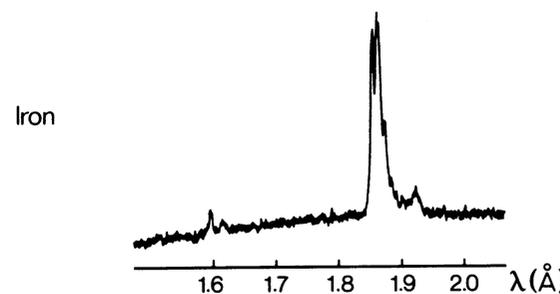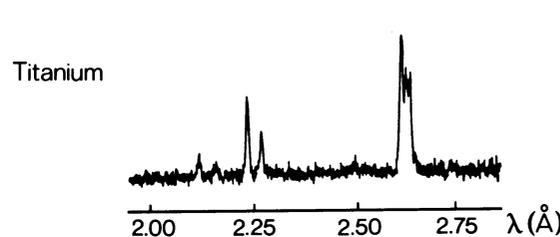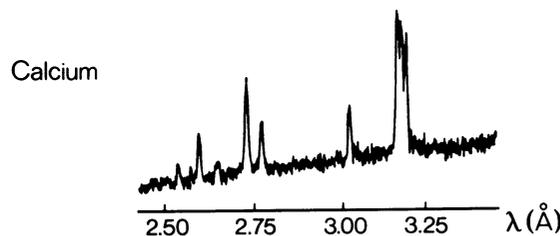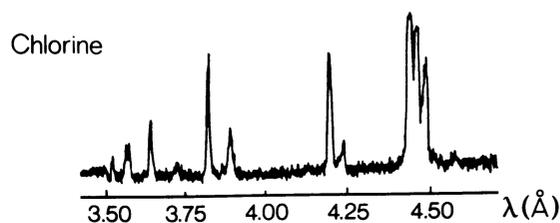
Channelling radiation, resulting from the incidence of electrons with an energy of only about 5 MeV on appropriately aligned diamond or silicon crystals hold out the hope of producing a bright tunable X-ray source.

One or more of these methods may, in the future, be developed as X-ray sources that can compete with synchrotron-radiation sources.
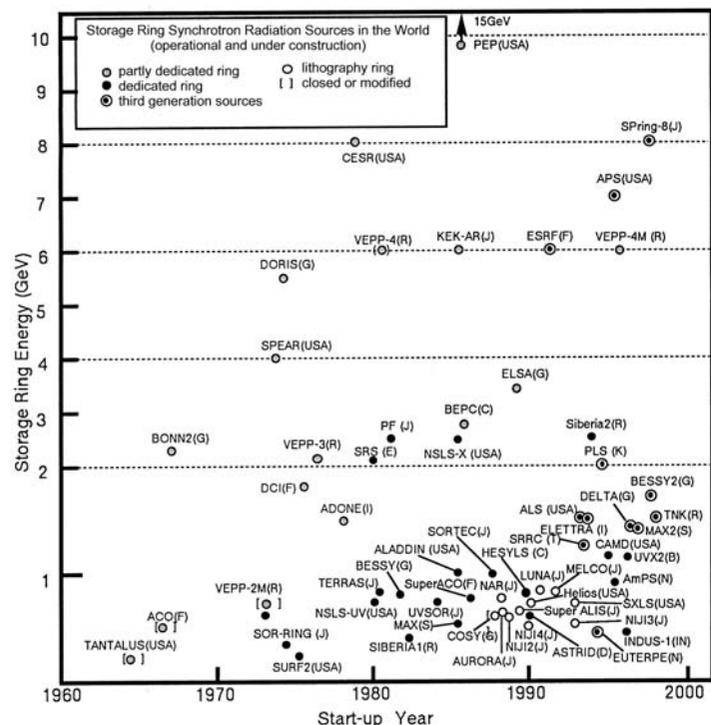

Fig. 4.2.1.11. The evolution of storage-ring synchrotron-radiation sources over the decades, as illustrated by their increasing number and range of machine energies (based on Suller, 1992).

Fig. 4.2.1.12. X-ray emission from various laser-produced plasmas. From Forsyth & Frankel (1980); courtesy of J. M. Forsyth.

4.2.2. X-ray wavelengths (By R. D. Deslattes, E. G. Kessler Jr, P. Indelicato, and E. Lindroth)

4.2.2.1. *Historical introduction*

Wavelength tables in previous editions of this volume (Rieck, 1962; Arndt, 1992) were mainly obtained from the compilations prepared in Paris under the general direction of Professor Y. Cauchois (Cauchois & Hulubei, 1947; Cauchois & Senemaud, 1978). A separate effort by the late Professor J. A. Bearden and his collaborators (Bearden, 1967) has been widely used in other aggregations of tabular data and was made available for some time through the Standard Reference Data Program at the National Institute of Standards and Technology (NIST). For simplicity in the following discussion, we use the Bearden database as a frame of reference with respect to which our

references