The NBS (NIST)-Daresbury Collaboration in Photoelectron Spectroscopy

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## Beginnings

The National Bureau of Standards (NBS) 180 MeV synchrotron was fully dedicated to synchrotron radiation research in 1967; in 1974 it became a dedicated storage ring in order to improve its usefulness for a variety of photo-physics experiments. The NBS electron storage ring synchrotron radiation source was called the Synchrotron Ultraviolet Radiation Facility (SURF). It underwent a series of modifications and upgrades in the early 1970s and was renamed SURF-II. SURF-II was formally commissioned in 1974 as a storage ring operating at about 240 MeV and stored beam currents of about 10 mA. Subsequent modifications during the 1980s raised the stored energy to about 283 MeV and higher stored beam currents.

At about the same time as SURF-II was being commissioned, the staff at NBS designed and constructed a new beamline which featured a 2m normal incident monochromator which produced monochromatic light from about 40 nm to greater than 120 nm[1].







$$\frac{d\sigma_{\rm v}}{d\Omega} = \frac{\sigma_{\rm v}}{4\pi} \left(1 + \frac{\beta_{\rm v}}{4} \left[3P\cos 2\theta + 1\right]\right)$$

where  $\sigma_{\rm v}$  is the total cross section for an electronic-vibrational transition v

 $eta_{_{\mathrm{v}}}$  is the asymmetry parameter for the transition

 $\theta$  is the angle between the ejected electron and the ligh electric field

P is the polariztion of the light

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$$N_{v} = N_{0v} \left( 1 + \frac{\beta_{v}}{4} \left[ 3P\cos 2\theta + 1 \right] \right)$$



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