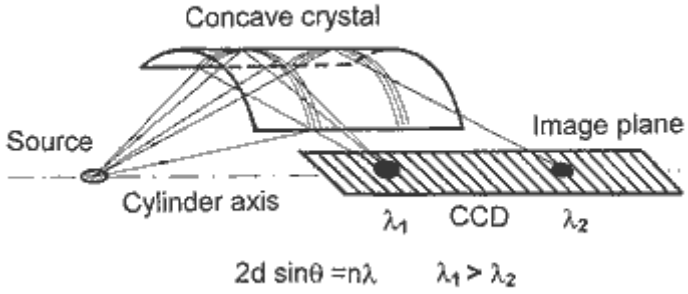
Von Hamos geometry *[Von Hamos L.V., 1933]* bases on cylindrically bent crystal, which disperses the divergent polychromatic light on a spatially resolving pixel detector (Fig.1). Cylindrical geometry of the crystal enlarges the accepting solid angle comparing to flat crystal and increases efficiency of optical device. Von Hamos geometry gives opportunity to make scanning-free measurements. The approach is of particular importance for time-resolving measurement. The von Hamos set-up are able to acquire the whole spectrum at once that leads to a significant reduction of the measuring time per spectrum.

The classical scheme could be adapted to the needs of application by using a crystal of a full figure of revolution and tilting detector perpendicular to the incoming beams *[Anklamm L., 2006]*

Fig.1. The ***von Hamos X-ray spectrometer*** consists of a cylindrically bent crystal, a position sensitive detector located on the cylinder axis and a radiation source on this axis as well.



In von Hamos geometry mosaic focusing takes place (Fig.2) and mosaicity of graphite crystal does not limit any more the spectral resolution.

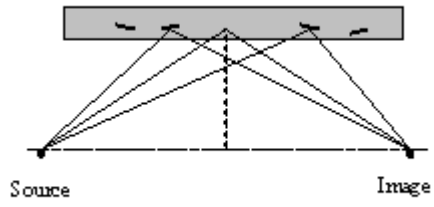


Fig.2. ***Mosaic focusing*** arises from the fact that X-rays from a monochromatic point source reflected on a mosaic crystal converge to a point of the equal distance from the crystal as the source before diverging away. Thus, in the symmetric geometry mosaic focusing enhances the intensity in the image plane as well as the spectral resolution.

Energy smearing is determined by geometrical aberration, source size and the Darwin width of small crystallites (intrinsic broadening). Although geometrical aberrations (mainly flat focusing errors and errors due to X-ray penetration into the mosaic crystal) are still influenced by crystal mosaicity, high energy resolution can be observed (Fig.3)

CC

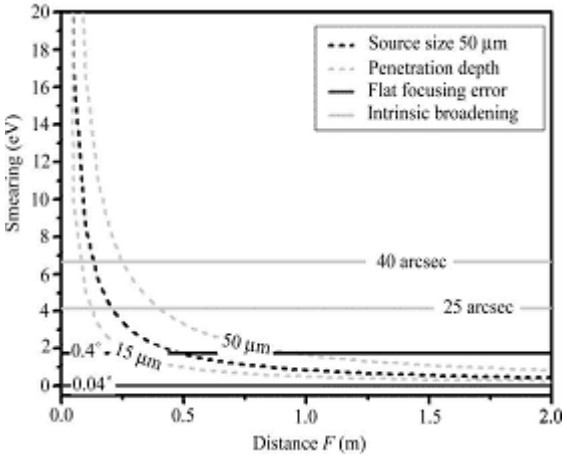


Fig.3. Smearing in the image plane: contribution of different factors calculated for 8 keV as a function of source to crystal and crystal to detector distance F *[Ice G.E,1990]*.

Graphite Optics have breathed new life and expanded the capabilities of von Hamos scheme. Earlier, the use of von Hamos was constrained by the difficulties in production of mosaic crystals of cylindrical geometry. Graphite optics can be realized not only as a cylinder of any required radius, it is possible to implement the scheme with the conical, double conical and elliptical optics, following the requirement of the application.