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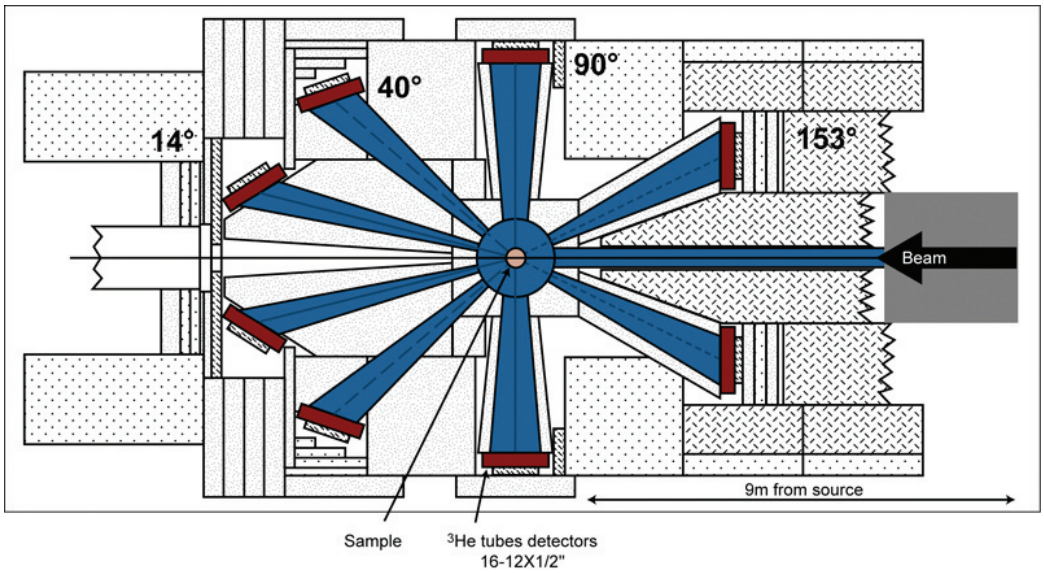
High-Intensity Powder Diffractometer (HIPD)

The High-Intensity Powder Diffractometer (HIPD) is designed to study the atomic and magnetic structure of materials that are available in polycrystalline and noncrystalline forms. High counting rates are achieved thanks to the proximity to the neutron source (primary flight path = 9 m). The beam size at the sample position is 1 cm wide and 5 cm high and collimation may be added to support small sample volumes and heavy ancillary equipment. HIPD detectors are located at ±153°, ±90°, ±40° and ±14°, each covering ±5°, which allows over two decades of momentum transfer (0.2-60Å^{-1}).

HIPD is specially suited for magnetic diffraction, magnetic and crystalline phase transitions, small crystalline samples, neutron absorbing materials, studies of amorphous solids, liquids, and studies on samples subjected to extreme environments, such as temperature or pressures. The exceptionally high data rates of HIPD also make it very useful for time-resolved and pressure studies. HIPD is ideal for studies on the atomic and magnetic structure of crystalline and non-crystalline powders, phase transitions, small samples, and absorbing materials. The high counting rates allow time-resolved measurements.



Specifications			
Wavelength range	0.20–10.0 Å		
Beam width	0.3–1.0 cm, variable		
Beam height	0.3–5.0 cm, variable		
Q range	0.2-60 Å^{-1}		
d-spacing range (approximate) and resolution	±14 ±40 ±90 ±153	0.20–33.6 Å .084–13.7 Å 0.40–6.65 Å 0.25–4.75 Å	3% 1.0% 0.5% 0.3%
Moderator	Chilled water at 283 K		
Sample environment	13-300 K, closed-cycle refrigerator; 10 GPa high-pressure cell; cryofurnace - 800 K contact instrument scientist		
Sample size	0.005–4 cm^3		
Experiment duration	less than 5 minutes to 1 day		