

## Reducing Background Scatter and Maximizing Diffraction Signal to Noise

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The diffuse background intensity in a diffraction pattern comes from many sources, both inside and outside the crystal, including:

- Internal and external solvent.
- Thermal motions of the protein and hydration water (thermal diffuse scatter).
- Static crystal disorder (e.g., associated with flexible loop regions or poor packing).
- The mount holding the crystal.
- Air along the beam path between source and detector.

How can you minimize the diffuse background and maximize your diffraction signal to noise?

- Use MicroMounts™ and/or our other sample mounting products in standard (not HT) thickness to obtain the lowest possible scatter from your mount.
- Minimize the amount of liquid around your crystal. Use a mount with an aperture that's a bit smaller than the crystal, and carefully remove excess liquid using a paper wick or by gently tapping on the steel rod of the mount.
- Use an X-ray beam that is smaller than your sample, to minimize the amount of scatter from surrounding liquid and the mount.
- Orient your crystal on the mount to minimize data collection at angles that place the plane of the mount along (instead of perpendicular to) the X-ray beam.
- Flash cool your crystal and collect data at T=100 K.
- Dehydrate the crystal to reduce diffuse scatter from internal water, using our Crystal Dehydration and Salvage Kit.
- Use a larger crystal to maximize the ratio of sample volume to liquid, mount and air volume within the X-ray beam.
- Use a helium filled bag or chamber to reduce scatter in the gas along the beam path.

Please contact [xtals@jenabioscience.com](mailto:xtals@jenabioscience.com) with comments or suggestions.