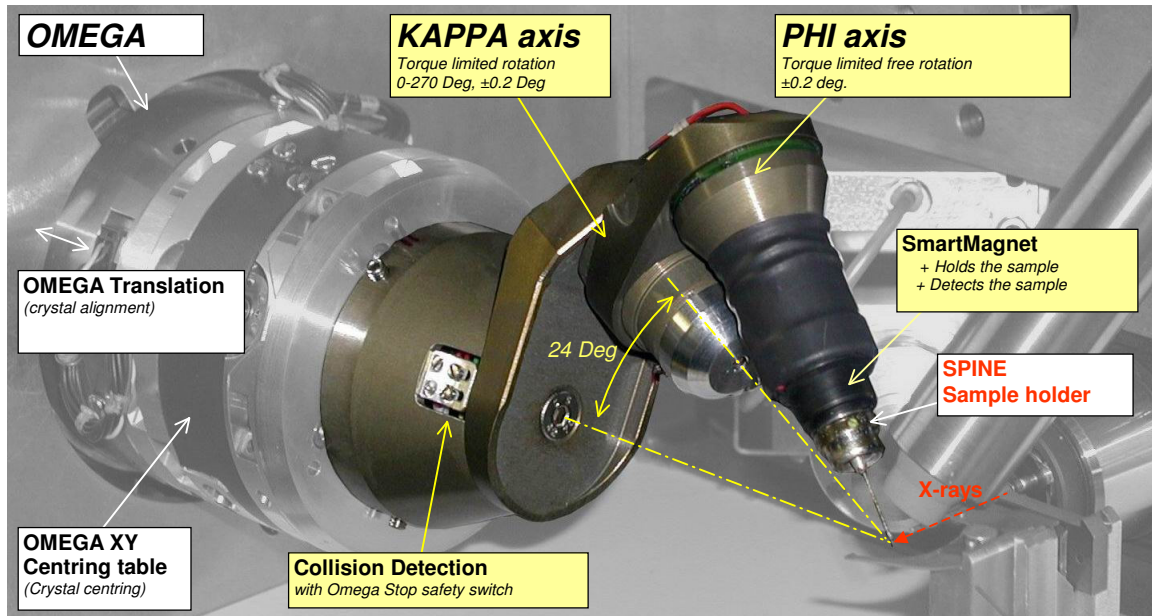


MK2 - miniKappa goniometer head *

Preliminary, January 2006

When mounted on top of the centering table of a **MD2 or MD2M diffractometer**, the miniKappa goniometer head allows reorienting crystals with a minimum risk of collision. Its concept takes advantage of the **unique SPINE sample holder length**. Tiny crystals can be processed in fast multi-passes scans without stability problem.



The miniKappa is designed for orienting crystals on the data collection axis of a host goniometer (OMEGA), the centring and alignment of the crystal being done with the centring and translation tables of OMEGA. The crystals should be mounted on a **SPINE sample holder** (European spine standard with fixed 22 mm length. <http://www.spineurope.org>, protocols menu) Contrary to usual Kappa goniometers, in this concept the **Sphere of confusion of the kappa is not relevant**, only the stability is important. Typically, the crystal stays in a sphere of about **3 µm radius** during a full rotation of OMEGA. The mechanics is protected against manual handling and collisions by **torque limited coupling** of the PHI and Kappa axes, and a by Slipping / Rocking mechanism on OMEGA. The low inertia and stiffness of the device allows for **fast multi-pass** data collection strategies.

STAC¹, a comprehensive software package that includes modules for calibration, direct motor access, crystal re-orientation calculation, automatic re-centering as well as smart multi pass strategy calculation is being developed. Using **STAC***, macromolecular crystallographers will benefit from the MK2 MiniKappa Goniometer Head for:

- Re-orienting crystals while keeping the crystal in the X-ray beam
- Capturing Bijvoet pairs on the same image by properly aligning the crystal axis parallel to spindle and beam
- Misalign crystals to avoid the blind zone
- Align crystal along an axis that allows highest completeness for smallest oscillation range
- Gain better spot shapes from deformed crystals (e.g. bent crystals)
- Get better crystal ranking by uniformly orienting all the crystals before screening
- Perform multiple crystal data collection by inheriting the orientation from a previous crystal

The integration of STAC with DNA makes easy the data collection with automatic data processing (indexing/integration/scaling). In addition, a manual sample transfer position helps loading samples with vials (no need of transfer arc)

¹ **STAC**: **ST**ategy for **A**ligned **C**rystals (Under development)

Funded by the **BIOXHIT** EU program (<http://www.bioxhit.org>)

*Preliminary information, subject to change without notice