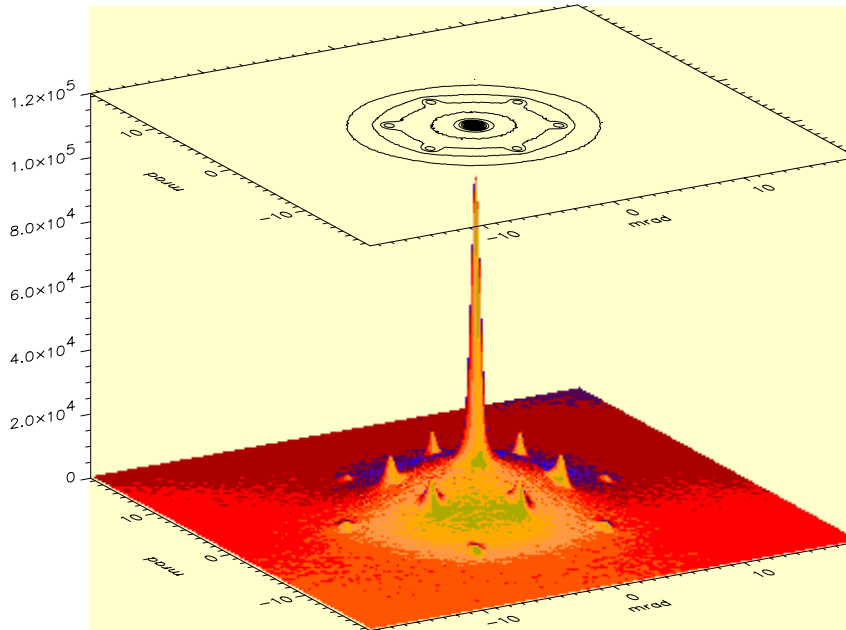
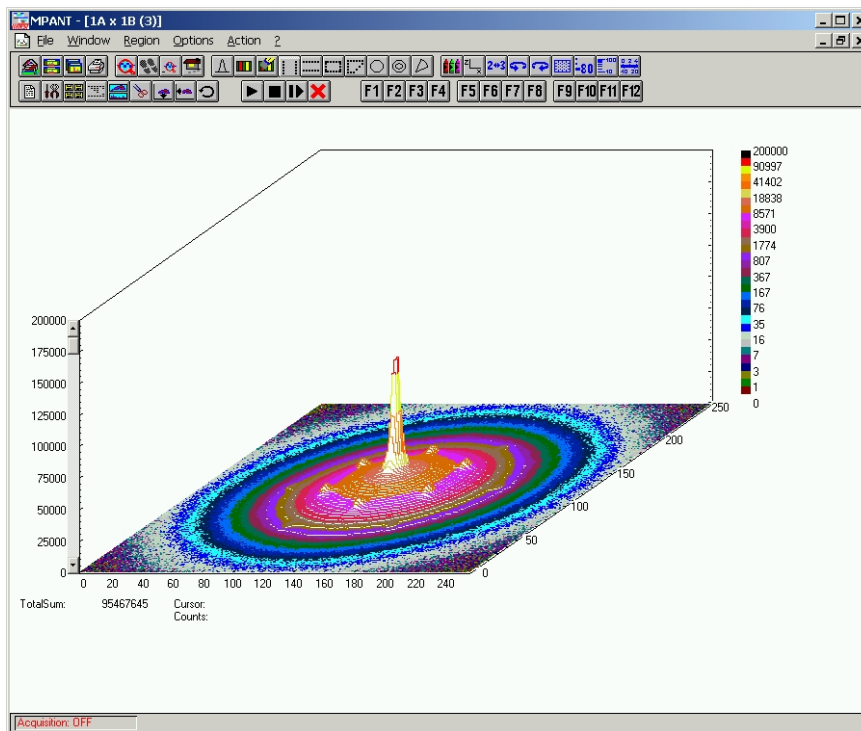


## Positron Annihilation

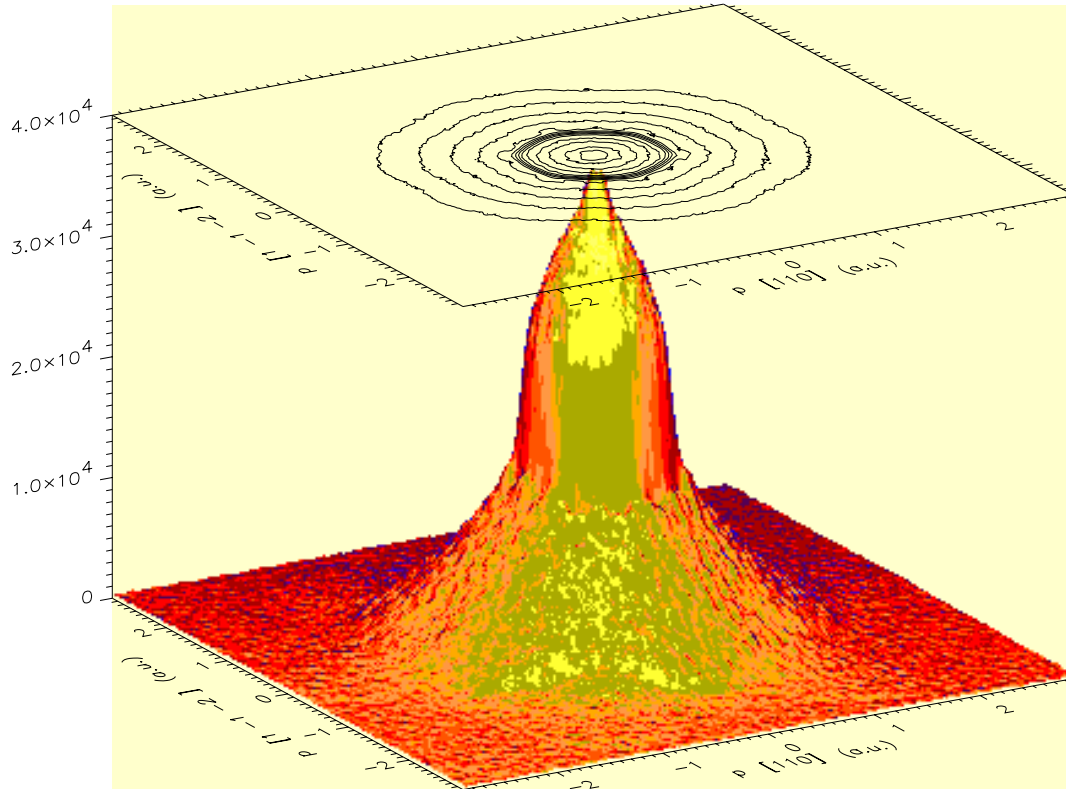
Contributed by Maurizio Biasini, ENEA, Italy



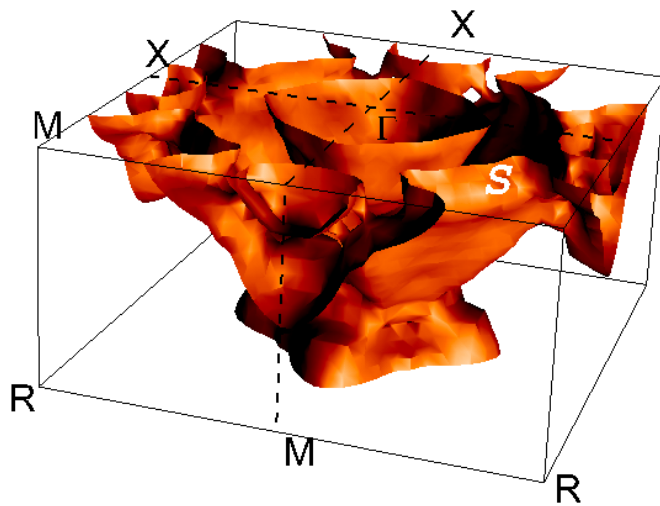
**Figure. 1** Momentum distribution in quartz obtained with the 2D-ACAR facility implemented by ENEA INN FIS DIAF. The integration direction is along the c axis of the hexagonal single crystal. The narrow central peak is ascribed to the momentum distribution of parapositronium, the electron-positron singlet bound state. The first and second series of satellite peaks are images at high momenta of the parapositronium peak due to the effect of the periodic crystal potential. The broad distribution beneath is ascribed to the annihilation of free positrons with valence electrons. One mrad is equivalent to 0.137 momentum a.u.



**Figure. 1b** View of the corresponding spectra acquired with the FAST ComTec multiparameter system.



**Figure 2** Momentum distribution in silver. The integration direction is along the [111] direction of the FCC crystal. The narrow central peak (FWHM  $\sim 0.16$  a.u.) is ascribed to the famous necks of the Fermi surface of the noble metals along the [111] type directions. Moreover, one can separate 2 broader distributions due to the momentum density of the  $5s^1$  electron (in the shape of an inverted hemisphere with a FWHM  $\sim 1$  a.u.) and to the  $4d^{10}$  electrons (in a gaussian shape, with a FWHM  $\sim 2.2$  a.u.).



**Figure 3** Experimental Fermi surface (FS) of the intermetallic rare-earth compound  $\text{TmGa}_3$  shown in half Brillouin zone (BZ). The 3-dimensional momentum density  $\rho(\mathbf{p})$  was reconstructed utilising topographic techniques. Subsequently, the FS was produced adopting the Lock-Crisp-West folding procedure [1]. The letter S denote a *nesting* part of the FS which is thought to be responsible of the antiferromagnetic ordering of the system.

[1] D G Lock, V H C Crisp and R N West, *J. Phys. F* **3** (1973) 561