# Experimental Report

09/06/2015

**Proposal:** **TEST-2273** **Council:** 10/2012

**Title:** Magnetic excitations in YbCo2Si2

**This proposal is a new proposal**

**Researh Area:**

**Main proposer:** **SCHMALZL Karin**

**Experimental Team:** SCHMALZL Karin

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**Samples:** YbCo2Si2

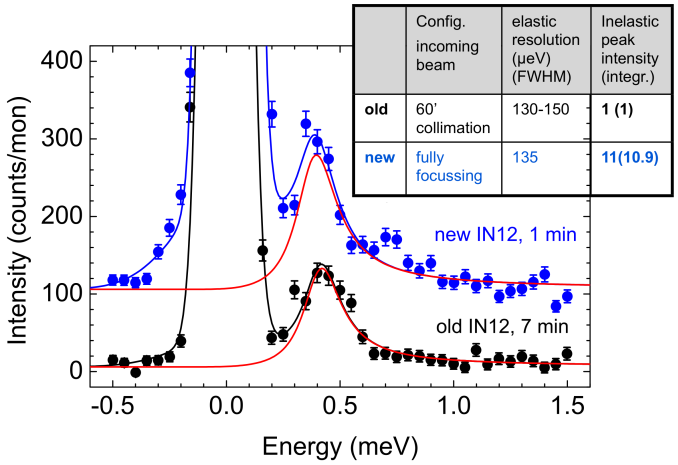
| Instrument | Req. Days | All. Days | From | To |
|---|---|---|---|---|
| IN12 | 2 | 2 | 03/07/2013 | 05/07/2013 |

**Abstract:**

# Upgraded IN12: Magnetic excitations in YbCo2Si2

From : 03/07/2013 To : 05/07/2013

To compare the old with the new IN12 instrument we performed scans with the same sample and same experimental conditions on the former and the upgraded IN12. The intermetallic compound $YbCo_2Si_2$ orders below T=1.7 K in an incommensurate structure and below T=0.9 K in a commensurate phase. The sample has been mounted in the scattering plane [110]-[001] and was composed of an array of about 20 co-aligned single crystals glued on a plate adding up to approx. 60 mg sample. Below 0.9 K the propagation vector $\tau$=(0.25,0.25,1) develops.
Fig. 1 shows energy scans performed in the commensurate phase at T=380 mK for fixed final wavevector $k_f$=1.3 $\AA^{-1}$ at Q=(0,0,1). The incoming beam has a different primary beam configuration for the two scans: The new IN12 with its new guide offers a double focusing monochromator whereas before at the former IN12 a horizontally flat monochromator and 60' collimation was employed before the sample.




| | Config. incoming beam | elastic resolution (μeV) (FWHM) | Inelastic peak intensity (integr.) |
|---|---|---|---|
| old | 60' collimation | 130-150 | 1 (1) |
| new | fully focussing | 135 | 11(10.9) |

Figure 1: Old vs. new IN12: Measurement of the same sample shows a gain for the integrated inelastic peak intensity by a factor of 9-11. Spectra show the same background and are shifted in intensity by about 100 counts. (Sample courtesy of O. Stockert, MPI-CPfS, Dresden, Germany.)

With the fit of the scans and background treated in the same way the elastic

resolution is the alike 130-150 $\mu$eV (FWHM) for the old IN12 and 135 $\mu$eV (FWHM) for the new IN12. Whereas in the inelastic integrated peak intensity we have a gain of a factor 9-11, also due the coarser Q resolution and to the possible acceptance of the sample of higher divergence. Note, the background of the spectra are equal for new and old IN12 spectrometer.
Also this scan covers only a small region of the offered wavelength range, the example demonstrates well the increased flux and the excellent energy resolution of the new IN12 spectrometer with a simultaneously same background as the previous instrument, giving an excellent signal-to-noise ratio.