FAKULTÄT für PHYSIK
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MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 05.07.2012, 16^{15} Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

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Searching for Supernova Debris on the Moon: ^{60}Fe and ^{53}Mn measurements in Lunar samples by means of Accelerator Mass Spectrometry (AMS)

The enhanced deposition of ^{60}Fe in a deep ocean ferro-manganese crust about (2.1±0.4) Myr ago (Knie et al., PRL 93, 171103 (2004), Fitoussi et al., PRL 101, 121101 (2008)) indicate that one or more supernova (SN) explosions occurred in the vicinity of the Solar System. That observation was only possible with the ultrasensitive AMS technique at the MLL, where we are able to measure concentrations of ^{60}Fe/Fe down to a level of 10^{-16}.
Because of its lacking atmosphere and negligible sedimentation rate, the Lunar surface is an excellent quantitative reservoir for SN debris. We searched for live ^{60}Fe and ^{53}Mn in different samples from 3 Apollo missions. ^{53}Mn is, similar as ^{26}Al and ^{60}Fe, a tool to trace nucleosynthesis activities. It is formed primarily during the explosive silicon-burning of the inner shells of SNe via ^{53}Fe which β-decays to ^{53}Mn with an 8.51 min halflife.
Samples where we found an enhanced ^{60}Fe concentration showed also an enhancement of ^{53}Mn. If confirmed, this could be the first detection of live ^{53}Mn originating from nucleosynthesis.
In this talk, I will briefly describe the measuring technique and show the results of the measurements made so far. I will discuss in detail the possible origins of the measured concentrations.

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