

# Laser spectroscopy of radioactive copper isotopes

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The evolution of nuclear structure with neutron excess in the copper isotope chain is currently under investigation by the COLLAPS collaboration. This experiment uses high-resolution laser spectroscopy, which unambiguously measures the nuclear spin and provides model-independent measurements of nuclear moments. It is therefore an ideal tool to study the nuclear structure. In the isotopes  $^{69,71,73}\text{Cu}$ , strong evidence of a migration of the  $\pi f_{5/2}$  level with increasing neutron number was observed in beta-decay studies of  $^{68-74}\text{Ni}$  [1,2]. It is predicted that the  $\pi p_{3/2}$  ground state will be replaced by the  $\pi f_{5/2}$  level at  $N=46$ . Two-neutron separation energies from ISOLTRAP mass measurements, show a signature for the onset of deformation in this same region of the copper chain [3].

This project aims to chart the onset of deformation and to confirm a  $\pi f_{5/2}$  ground-state configuration at  $N=46$ . It also aims to measure the spin/parity of  $^{72}\text{Cu}$ , and thus resolve the inconsistency between recent results from in-source spectroscopy and beta-decay studies [4,5]. An initial on-line run was carried out in September 2006. The hyperfine structures of  $^{64,66,67,68g,68m,69,70g}\text{Cu}$  were resolved and the magnetic dipole and electric quadrupole moments, nuclear spins and isotope shifts subsequently extracted. These results and future prospects for this project in 2007 will be presented and discussed.

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**Author:** Dr FLANAGAN, Kieran (KU-University of Leuven)

**Co-authors:** Dr CHEAL, Bradley (University of Manchester); Dr GEPPERT, Christopher (GSI); Dr FOREST, David (University of Birmingham); Mr YORDANOV, Deyan (KU-University of Leuven); Dr TUNGATE, Garry (University of Birmingham); Prof. NEYENS, Gerda (KU-University of Leuven); Dr BILLOWES, Jon (University of Manchester); Dr BLAUM, Klaus (University of Mainz); Dr KOWALSKA, Magdalena (University of Mainz); Dr CAMPBELL, Paul (University of Manchester); Prof. LIEVENS, Peter (KU-University of Leuven); Prof. NEUGART, Rainer (University of Mainz); Dr NÖRTERSCHÄUSER, Wilfried (University of Mainz)

**Presenter:** Dr FLANAGAN, Kieran (KU-University of Leuven)

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