



JOHANNES GUTENBERG
UNIVERSITÄT MAINZ

PROJECT 8

To strengthen its neutrino physics research program, the University of Mainz offers

1 PhD position (EG13/2) starting Jan 1st 2020

at the Cluster of Excellence PRISMA+ to work on "Project 8", a next generation neutrino mass experiment (<http://www.project8.org>).

Neutrino oscillations provide a clear indication the neutrinos are not massless as assumed in the Standard Model of particle physics. Yet, the masses of the neutrinos are several orders of magnitude lower than those of other fermions, and only upper limits have been set so far. Today, the most sensitive method to observe neutrino masses in the laboratory is the observation of the endpoint of the tritium β -decay spectrum. In this decay the maximum energy the electron can acquire is the full decay energy minus the neutrino mass. However, only a tiny fraction of electrons end up close to the endpoint, so the number of observed decays with very good energy resolution are key parameters in such an experiment.

Towards this goal, the Project 8 collaboration has developed the novel method of Cyclotron Radiation Emission Spectroscopy (CRES), in which the electron energy is determined by its radio frequency emission when trapped in a magnetic field. A first tritium spectrum is being recorded in an existing test setup with a small volume inside a waveguide read out by a single antenna. Enlarging the readout volume requires a phased antenna array and real-time interferometric beam-forming techniques to form an online trigger condition. Mainz is strongly involved in several key areas of the project, including the data acquisition and triggering system. Next to an inquisitive nature and creativity, hardware or electronics experience, in particular in firmware programming on FPGAs will increase the chance of success.

Please send your application by **Sept 1st**, including

- a letter of motivation (max. 1 page)
- your curriculum vitae
- the name and email address of one referee (no letter required)
- a copy of your relevant certificates and grades

to the address below (electronic documents preferred). The candidate must hold a Master degree in physics or astrophysics with at least the German degree "good" (or equivalent grade) at the starting date. Please do not hesitate to contact us in case of any questions.

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