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High precision measurement of the final-state distribution in 8B decay

The measurement of the undistorted spectrum of 8B neutrinos is necessary to extract information on the neutrino oscillation parameters from the solar neutrino spectrum observed on Earth.
Several experiments aiming at determining this intrinsic spectrum have been performed using different techniques. The latest results of Bhattacharya et al. [1] and Winter et al. [2] show large disagreement with the measurement of Ortiz et al. [3].
We have measured with a high precision the 8B beta final state distribution, reducing the systematic uncertainties. For this purpose, a 18.7 MeV 8B beam from the TRIμP separator at KVI was implanted in a 75 μm thick double-sided stripped silicon detector [4,5]. The detection of the two alpha particles resulting from the decay of the first excited 2+ state in 8Be, together with a full beta-summing GEANT4 simulation, enabled us to reconstruct the final state distribution with a precision of about 5 keV down to 350 keV excitation energy.
The R-matrix fit of this distribution will be presented, and the obtained neutrino distribution will be compared with the previously obtained results.

[1] M. Bhattacharya et al., Phys. Rev. C73, 055802 (2006)
[2] W.T. Winter et al., Phys. Rev. Lett. 91, 252501 (2003)
[3] C.E. Ortiz et al., Phys. Rev. Lett. 85, 2909 (2000)
[4] D. Smirnov et al., Nucl. Instr. and Meth. A547, 480 (2005)
[5] J. Büscher et al., Nucl. Instr. and Meth. B266, 4652 (2008)

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yes

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