Friday
Oct. 18th
At 2 pm

From Parity Violation to Nuclear Structure and New Physics

Abstract:

Parity-violating asymmetry (A_{PV}) in elastic scattering of longitudinally polarized electrons by a nucleus provides a powerful tool for precision tests of the Standard Model (SM) and for studies of the nuclear structure. Parity violation is generated by the interference of parity-even γ and parity-odd Z^0 virtual boson exchanges in the scattering process. Because Z^0 couples primarily to neutrons at low four-momentum transfer squared Q^2, A_{PV} turns out to be sensitive to the spatial distribution of neutrons within the nucleus. As a result, one can deduce the thickness of the neutron skin from a measurement of A_{PV}. Besides this, A_{PV} can be used to extract one of the fundamental parameters of the SM - the weak mixing angle. The latter quantity is known in the SM with a remarkable accuracy and any significant deviation of its experimental determination from the theoretically predicted value would indicate to physics beyond the SM.
In my talk I will review the parity violating program at the MESA facility in Mainz and discuss our recent theoretical study of the prospective measurement of A_{PV} on a ^{12}C target.

CYCLOTRON COLLOQUIUM

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Dr. Oleksandr Koshchii

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Refreshments will be served at 1:45 pm

TEXAS A&M UNIVERSITY