SACRAMENTO STATE

Department of Physics and Astronomy

SPRING 2021 Colloquium Series - Virtual

"Applications of Operator Strength Decompositions to Computational Nuclear and Stellar Physics"

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Sac State Physics Alumnus, Class of 2010

Using a modified Lanczos matrix diagonalization algorithm, useful information is extracted for two different types of nuclear matrix operators. In the first application, broken symmetry group operators of the Nuclear Hamiltonian are used to analyze the transition in the rotational inertia of Chromium isotopes leading to a 'backbending' in the energy spectrum. Though the Casimir operator of the groups do not commute with the nuclear Hamiltonian, fragmented patterns emerge called Quasi-Dynamical Symmetries. In the second application, transition strengths for beta processes in massive star, such as electron capture, are computed for heavy nuclei in the PF shell (mass number, A = 40-80). These transitions occur at temperatures and densities that require many high energy eigenstates of the parent nucleus to compute accurately. A method using semi-converged states is developed.

Thursday, April 22, 2021
4:00 – 5:20PM

Talk will be via Zoom - contact physics@csus.edu for links

Open & Free to all students, faculty and public