

Furnstahl Group: Low-Energy Nuclear Theory (LENT)

Prof. Dick Furnstahl's group does theoretical research on low-energy nuclear physics. In this context, "low-energy" means the structure and reactions of bound atomic nuclei (as opposed to relativistic heavy-ion collision physics also studied at OSU) with applications to astrophysics, such as nucleosynthesis and neutron star physics. The research by group members develops and applies:

- renormalization group (RG) methods to nuclei;
- effective field theories (EFT) for few- and many-body systems;
- Bayesian statistics and machine learning for nuclear UQ and physics discovery;
- computational physics methods.

There are typically 2-3 graduate students doing thesis work (i.e., past candidacy) at any given time.

Papers from the last two years co-authored by Prof. Furnstahl can be found [here](#); these include work in the last year by graduate students Anthony Tropiano ([Operator evolution from the similarity renormalization group and the Magnus expansion](#)), Jordan Melendez ([How Well Do We Know the Neutron-Matter Equation of State at the Densities Inside Neutron Stars? A Bayesian Approach with Correlated Uncertainties](#) and several more by Jordan), and Alberto Garcia and Patrick Millican ([Efficient emulators for scattering using eigenvector continuation](#)).

Recent talks by Prof. Furnstahl (the slides are linked) include "[Short-range-correlation physics in atomic nuclei](#)," "[Turning the nuclear EDF method into a proper EFT](#)," "[Similarity Renormalization Group \(SRG\) in Nuclear Physics](#)," and "[Theory error bars for nuclei](#)." Follow the links for slide from talks at the Fall, 2020 APS Division of Nuclear Physics (virtual) meeting by LENT graduate students [Alberto Garcia](#), [Patrick Millican](#), [Anthony Tropiano](#), and [Mostopha Hisham](#).

The LENT group has several funding sources: the National Science Foundation ([abstract from current grant](#)), the Department of Energy through the SciDAC [NUCLEI project](#), and the [BAND Framework Project](#) (see also the [BAND Manifesto](#)).

If you have any questions, please do not hesitate to send email to Furnstahl.1@osu.edu.