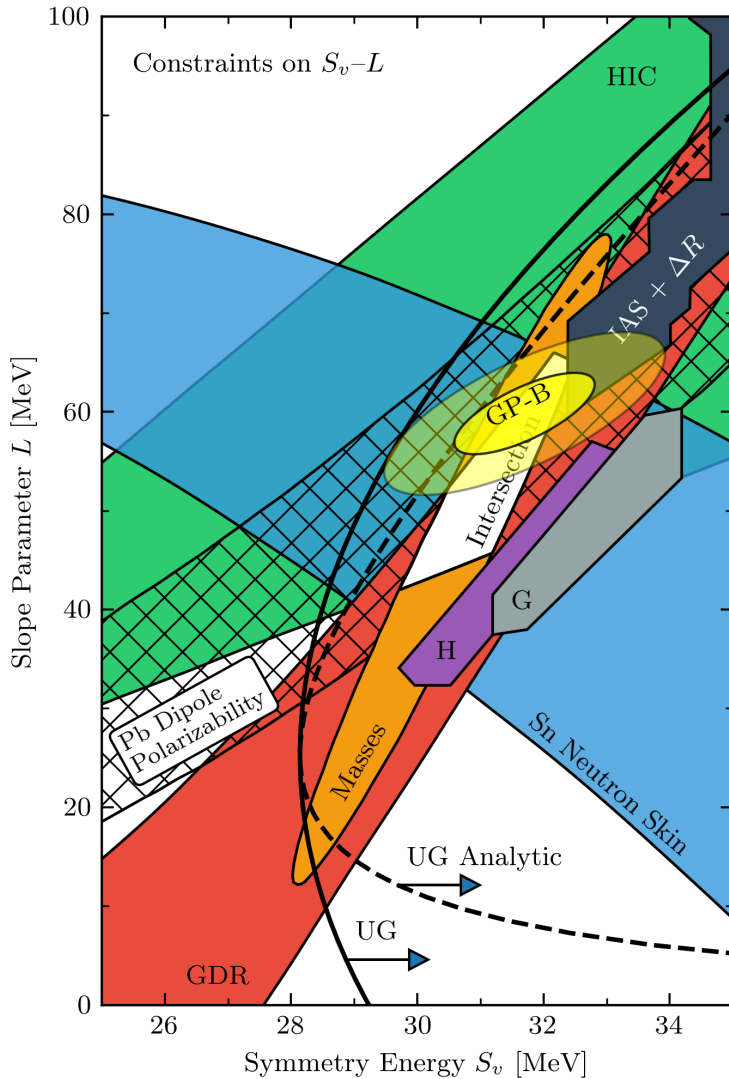


# How well do we know the matter that is inside of neutron stars?



Constraints on the symmetry energy and its density dependence from experiment and new theory with UQ (yellow ellipses).

## Objectives

- Create a framework for effective field theory truncation errors that includes correlations within and between observables.
- Enable efficient and reliable evaluations of derived quantities (e.g., speed of sound).
- Apply to the dense matter in neutron stars.

## Impact

- Produced the first statistically meaningful uncertainty estimates for key quantities of neutron stars. Correlations mean much smaller uncertainty than one might naively expect.
- Prediction for the symmetry energy – slope parameter correlation in excellent agreement with net experimental constraints (see figure).
- Equation-of-state results in good agreement with observations from gravitational waves and NICER.

## Accomplishments

C. Drischler et al., arXiv:2004.07232 (2020).