

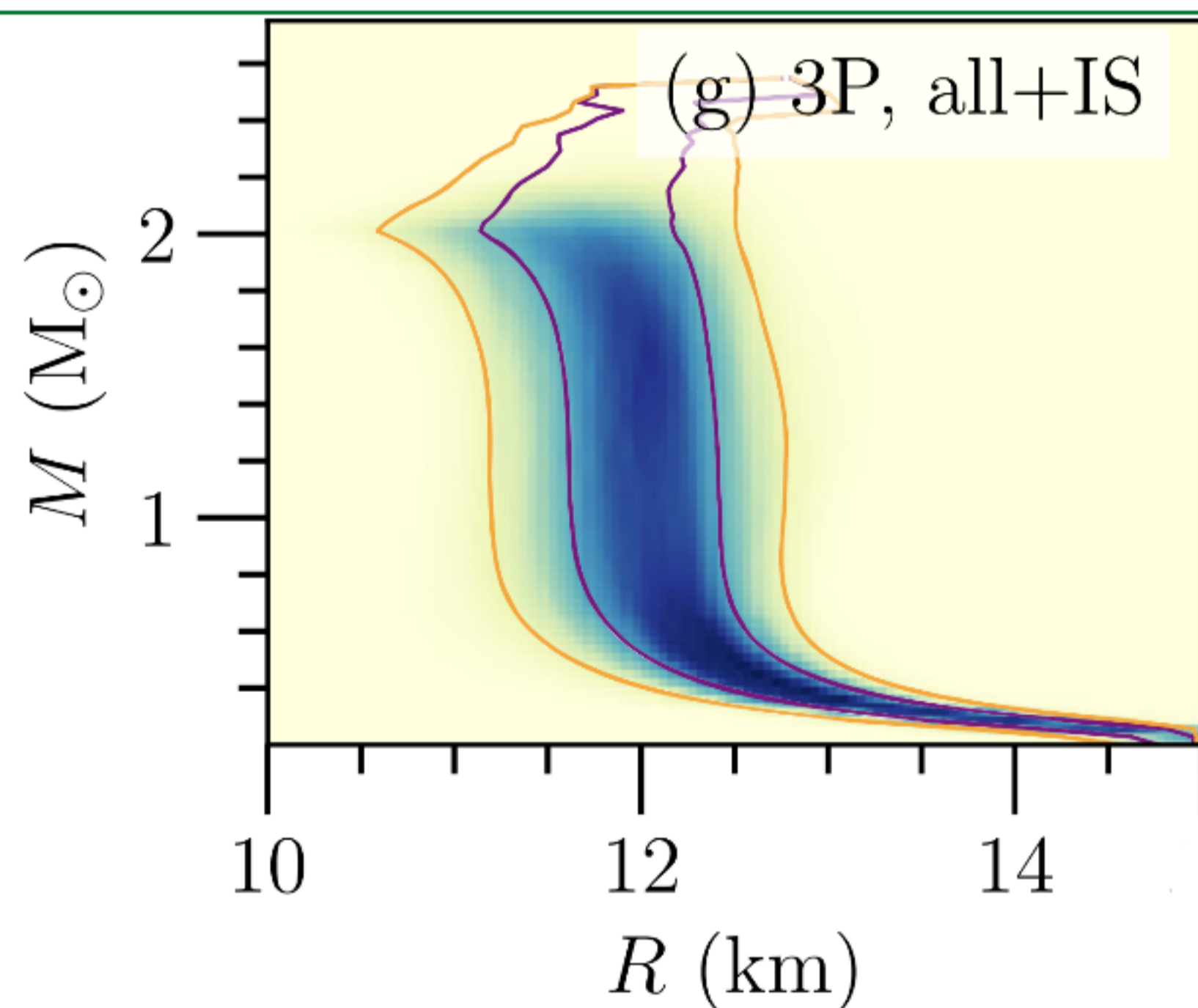
# Equation of State from Multi-Messenger Observations

## Objectives

Determine the equations of state which are consistent with electromagnetic and gravitational wave observations of neutron stars

## Impact

Allows us to ensure that simulations are using equations of state which are consistent with recent observations from LIGO and electromagnetic observatories



## Accomplishments

- Included observations of GW 170817 from LIGO, J0030 from NICER, as well as other X-ray binary neutron stars
- World's best current constraints on the equation of state of dense matter
- Showed that the increasing availability of observational data is decreasing the systematic uncertainties
- Tested the presence of additional systematic uncertainties in the EM observations: found no evidence of disagreement with LIGO constraints

Citation: Phys. Rev. Lett. 126 (2021) 061101

Contact: Andrew W. Steiner ([awsteiner@utk.edu](mailto:awsteiner@utk.edu))



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science

**TEAMS**

Towards Exascale Astrophysics of Mergers and Supernovae