



# PHYSICS AND ASTRONOMY SEMINAR

## Dr. Jorge Barrera Ballesteros

Johns Hopkins University

### “Chemical Evolution in the Era of IFU surveys”

#### Abstract

I will present the main results of our analysis of the local metallicity of the ionized gas for more than  $5 \times 10^5$  star forming regions (spaxels) located in 1023 nearby galaxies included in the SDSS-IV MaNGA IFU survey. Among them, I will show the local mass - metallicity relation; its weak relation with global parameters as well as the lack of secondary relation of the global MZR with the SFR. We also explore the impact of the gas fraction in the local enrichment. We use the dust extinction and stellar template fitting in each spaxel to estimate the local gas and stellar mass densities, respectively. We also use the measured rotation curves from H-alpha velocity fields to determine the local escape velocity. We have then analyzed the relationships between the local metallicity and both the local gas fraction ( $\mu$ ) and  $V_{\text{esc}}$ . We find that metallicity decreases with both increasing  $\mu$  and decreasing  $V_{\text{esc}}$ . By examining the residuals in these relations we show that the  $\mu$ -Z relation is more important. We show that the gas-regulator model of chemical evolution seems to provide a reasonable explanation of the metallicity on local scales. The best-fit model parameters of this model are consistent with metal loss been caused by momentum-driven galactic outflows. We also argue that both the gas fraction and local escape velocity are connected to the local stellar surface density, which in turn is a tracer of the epoch at which the local dominant stellar population formed.

Thursday, October 19, 2017

2:30 p.m.

Hickman Building

Room 120