

# PHYSICS

UNIVERSITY OF MICHIGAN

PRESENTS

## Today's Saturday Morning Physics Speaker



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### Abstract

Galaxy Clusters are the largest astronomical objects in the Universe. These cosmic giants are bound together by gravity and are formed by galaxies, hot gas, and the mysterious dark matter. By counting them and measuring their masses, we can understand the content and evolution of the Universe. In this talk, I will present how we can use the light for weighing galaxy clusters. I will also show how the Dark Energy Survey uses them to measure the quantity of dark matter and properties of the even more mysterious component, the dark energy.

### Biography

Dr. Maria Elidaiana da Silva Pereira is a postdoctoral researcher at University of Michigan. Her work focuses on Observational Cosmology, gravitational lensing, galaxy clusters, and gravitational waves. One of the biggest open questions in Cosmology today is the origin of the accelerated expansion of the Universe. To have an accelerated universe, there must be some force pushing all the galaxies away from each other, and this force must be strong enough to counteract the gravity which binds the galaxies together.

Currently, we do not know what the cause of this force is, we just know that it exists, and we call this new mysterious force “dark energy.” Many astronomical surveys are under development to measure the amount and properties of dark energy by studying different probes such as supernovae, galaxies, and galaxy clusters.

Dr. Pereira is a member of the Dark Energy Survey and uses galaxy clusters to study how the distribution of matter in the Universe is affected by the cosmic acceleration. To do that, she measures the mass of galaxy clusters using the weak gravitational lensing effect, which is the bend of the light of background galaxies by massive foreground objects such as galaxy clusters.

More recently, she is also interested in measuring the expansion rate of the Universe, known as the Hubble’s constant, using gravitational wave events as standard dark & bright sirens, which are the results of the collision of two neutron stars or two black holes, respectively.

Dr. Maria Elidaiana da Silva Pereira received her M.Sc. and Ph.D. degrees in Physics from the Brazilian Center for Research in Physics (CBPF), Brazil. She received her B.S. and B.Ed. in Physics from the Rio de Janeiro State University, Brazil. She is a member of the American Physical Society, LSST-DESC Collaboration, Cosmic Explorer Consortium, and the Snowmass 2021 Early Career Survey Initiative.

**YouTube Link to Saturday’s Talk:** [https://www.youtube.com/watch?v=9h8I\\_P19xLQ](https://www.youtube.com/watch?v=9h8I_P19xLQ)

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