BOSTON UNIVERSITY

Astrophysics Seminar
Monday, February 8, 2016

Are Black Holes as Simple as They Used to Be?

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Abstract:

Astrophysical black holes are in some ways the simplest object in Nature, being described by only two quantities: mass and spin. A primary goal of astrophysical research into these objects has been to measure their mass and spin, and then further determine if we see the associated "exotic" effects of the warping of space time predicted by General Relativity. Our prime tool for such studies is the X-ray emission from accreting material surrounding these objects, especially in X-ray binaries. The original theoretical conception of X-ray emission from X-ray binaries was that of a rather simple quietly accreting, thermal, thin disk. This picture has been replaced with an enormously more complicated beast: a violently turbulent MHD disk (which may or may not be truncated at radii greater than the innermost marginally stable orbit predicted by General Relativity), a hot corona (which may or may not be efficiently radiating away its thermal energy), a jet (which may or may not contribute to the X-ray), an outer disk that might have both warps and winds, an incoming accretion stream, etc. The presence and form of each of these components rely upon many different factors, and we have strong observational evidence for all of them. However, underlying all of these complications seems to be rather simple behavior which surprisingly agrees with some of our basic, original models. If true, this allows us to describe our observations with the predictions of General Relativity, and measure such quantities as black hole spin. In this talk I will describe both historical and recent observations of black hole systems using X-ray satellites. I will present the simple, historical models, describe the astrophysical complications that we must consider with modern observations, but then describe how many of the simplest ideas surprisingly seem to be borne out in real astrophysical black hole systems.

3:15 pm
Refreshments
CAS Room 500

3:30 pm
Seminar
CAS Room 502

Next Week

Tuesday, 2/16

- *Atish Kamble*
  CfA
- TBD

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