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Accretion disks around compact objects

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Accretion disks are a flattened band of spinning matter around a massive central object such as a black hole. While a black hole, by definition, does not emit any radiation, an accretion disk does. Its spectrum depends, among other things, on the properties of the surrounding spacetime. This makes them very useful astrophysical objects for testing general relativity, probing spacetime, and studying the properties of the central compact object. The most prominent emission line of an accretion disk is the fluorescent line of Iron. In theory the peak would be very narrow in energy but due to non-relativistic (Doppler), special relativistic (beaming) and general relativistic effects (gravitational red-shift) the line is not a spike but a skewed and asymmetric profile. The profile of the line allow us to probe spacetime around the disk but can also be use to compute the black hole's spin. The main goal of my thesis is to use accretion disks and Fe iron line profiles to test alternative spacetime theories, focusing my work in boson stars.

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