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Lecture 1.

"Accretion disk - wind connection"

Foundations of the accretion disk + accretion powered wind theory is revised on the introductory level paying special attention to basics of magnetic and radiation driving.

Lecture 2.

"Line-driven winds near black holes"

From observations of broad absorption line regions in quasars it is concluded that active galactic nuclei may have winds as fast as $0.1 c$.

Acceleration of the outflowing plasma due to absorption of the radiation flux in lines is believed to be responsible for this phenomena.

More abstract:

It has been demonstrated both theoretically and observationally that accretion disks around compact objects can be powerful sources of fast plasma outflows. Among the most important processes known to work are magnetic and radiation driving. While realistic accretion disk winds are most likely driven by the combination of the radiation and magnetic forces here we focus on the mechanism when momentum is extracted most efficiently due to absorption of the radiation flux in lines of abundant elements. In the paper of Dorodnitsyn (2003) it was proposed a mechanism when line-driven acceleration occurs in the presence of the gravitational field provided that it is enough strong for the gravitational redshifting can play an important role. The generalization of these studies in the frame of General Relativity is the problem that we address in this paper.