

30.05.2014

## Problems

1. Derive the formula for Eddington luminosity, for which the gravitational force is balanced by the radiation force.

What would be the Eddington accretion rate, assuming efficiency of  $1/16$ , for accretion onto a black hole in the center of a GRB? What is the realistic accretion rate in such a center? Express this rate in [cgs] units and then in Eddington units. Take into account the scenario that assumes that short GRBs originate from a merger of two neutron stars.

2. Write the Navier-Stokes equations in cylindrical coordinates. Simplify the equations, under the assumption of an axially symmetric, geometrically thin, stationary accretion disk. What components of the stress tensor are non vanishing?

(due date: 5.06.2014)