NO-Z MODEL FOR MAGNETIC FIELDS OF ACCRETION DISCS

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Magnetic fields of accretion discs around such objects as white dwarfs, neutron stars and black holes can play an important role in their evolution. For example, they can explain the transition of angular momentum and another effects (Shakura, Sunyaev 1973). The typical kinematic parameters of them allow us to suggest that they can be connected with the dynamo mechanism. This process is well known for the Sun, galaxies and another celestial bodies. It is usually based on differential rotation and alpha-effect, which compete with turbulent diffusion. So the dynamo is a threshold mechanism: the magnetic field can be generated only for large values of dimensionless dynamo number.

As for the galaxies which have a shape of thin disc, the magnetic fields are usually studied using no-z approximation (Moss 1995). It assumes that the field mainly lies in the equatorial plane, so we can change some of the partial derivatives by algebraic expressions. This model gives us an opportunity to have both theoretical estimates and numerical solutions (Moss *et al.* 2016a).

As for the accretion discs, it is possible to use the similar approach, taking into account another time and length scales (Moss *et al.* 2016b). We have constructed a model of the magnetic field of accretion discs using no-z approximation. One of the main features is connected with conditions on the inner boundary and type of the nonlinearity in the dynamo equations. We have shown that if we take physically justified formula, it is possible to obtain the solutions that describe different effects properly. During first period, the magnetic field grows exponentially and then saturates. The saturated field has quite moderate values, having a maximum near the inner boundary. We present typical dependences for the field in different typical cases.

References

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