Federal State Institution of Science
Institute of Continuous Media Mechanics
Ural Branch of Russian Academy of Sciences

Book of Abstracts

Russian Conference on Magneto Hydrodynamics

September 20 – 22, 2021, Perm, Russia

Perm, 2021

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THE MAGNETIC HELICITY AND HIGHER HELICITY INVARIANTS AS CONSTRAINTS FOR DYNAMO ACTION

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It is known by the Arnold's Theorem that the magnetic helicity is not only an invariant in an ideal MHD, but also admits a gauge-invariant density [1], [2]. We will consider a question: «Is it possible to achieve an exponent -1.7 for a turbulent spectrum of the magnetic energy?» We get an affirmative answer, assuming that quasi-periodic magnetic fields are distributed free over the scale. Our answer uses asymptotic Hopf invariants [3], and the M-invariant [4] (a numerical measure of knottiness of magnetic lines).

1. *Dmitry Sokoloff, Peter Akhmetyev and Egor Illarionov, Fluid Dyn. Res. 50 (2018) 011407 (10pp) https://doi.org/10.1088/1873-7005/aa6e2e*

2. *P.M.Akhmet'ev, Magnetic helicity flux for mean magnetic field equations, TMF 2020 Vol. 204, N1, pp.130-141*

3. *P.M.Akhmet'ev, I.V.Vyugin, Dispersion of the Arnold's Asymptotic Ergodic Hopf Invariant and a Formula for Its Calculation, Arnold Mathematical Journal*

4. *P.M.Akhmet'ev, On a higher integral invariant for closed magnetic lines, Journal of Geometry and Physics 74 (2013) 381–391.*

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