



Nex



Baixe e Já Comece a Vender

AIP

 Physics of Plasmas

HOME

BROWSE

MORE ▼

[Home](#) > [Physics of Plasmas](#) > [Volume 20, Issue 8](#) > [10.1063/1.4819035](#)

< PREV

NEXT >



No Access

Submitted: 18 June 2013

Accepted: 06 August 2013

Published Online: 21 August 2013

Magnetorotational instability, current relaxation, and current- vortex sheet

Physics of Plasmas **20**, 082126 (2013); <https://doi.org/10.1063/1.4819035>F. E. M. Silveira^{1, a)} and R. M. O. Galvão^{2, b)}[View Affiliations](#)[View Contributors](#)

Topics ▼

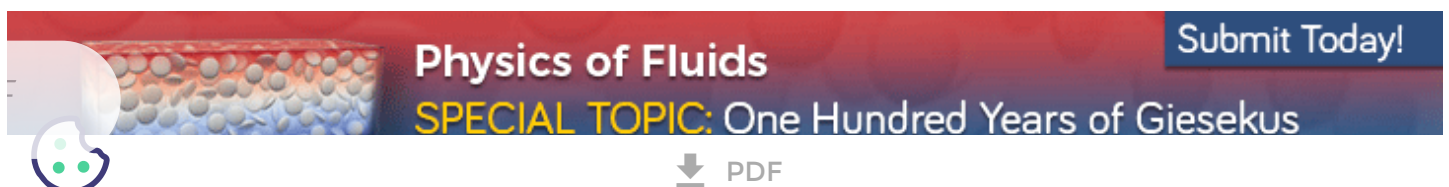
 PDF

ABSTRACT

The conjugate effect of current relaxation and of current-vortex sheet formation on the magnetorotational instability is explored in a conducting fluid. It is found that the relative amplification of the magnetic viscosity from marginal stability to the instability determined by the maximum growth rate is around 924% when resistive effects dominate, while the corresponding quantity is around 220% in the ideal limit. This shows that the conjugate influence is much more efficient to amplify the magnetic viscosity than just the effect due to the standard magnetic tension. It is also found that the magnitude of the magnetic viscosity is effectively enhanced by the conjugate influence. The results presented here may contribute to the understanding of the various processes that play a significant role in the mechanism of anomalous viscosity observed in Keplerian disks. It is argued that the new effect shall be relevant in thin accretion disks. It is also mentioned that the proposed formulation may be of interest for some theories of magnetic reconnection. Possible extensions of this work are suggested.

ACKNOWLEDGMENTS

The authors are grateful to an anonymous referee for helpful comments. Thanks are due to M. Assunção for the help with the figures. This work was partially supported by FAPESP and CNPq, Brazilian government agencies.

A banner for the journal 'Physics of Fluids' featuring a microscopic view of particles. It includes a 'Submit Today!' button, a 'SPECIAL TOPIC' announcement for 'One Hundred Years of Giesekus', and a PDF download icon.

Physics of Fluids
SPECIAL TOPIC: One Hundred Years of Giesekus
Submit Today!
PDF

Resources

AUTHOR

LIBRARIAN

ADVERTISER

General Information

ABOUT

CONTACT

HELP

PRIVACY POLICY

TERMS OF USE

FOLLOW AIP PUBLISHING:



Website © 2022 AIP Publishing LLC.

Article copyright remains as
specified within the article.

Scitation

-



 PDF