Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

**Influence of magnetic topology on transport and stability in Stellarators** FRANCISCO CASTEJÓN, CIEMAT, AKIHIDE FUJISAWA, KATSUMI IDA, National Institute for Fusion Science. Toki, Japan, JOSEPH N. TALMADGE, University of Wisconsin, TERESA ESTRADA, DANIEL LÓPEZ-BRUNA, CARLOS HIDALGO, CIEMAT, CIEMAT TEAM, NATIONAL INSTITUTE FOR FUSION SCIENCE TEAM, UNIVERSITY OF WISCONSIN TEAM — Stellarators are suited to study the effect of magnetic topology on transport and stability, since they present good control of their magnetic configurations and rotational transform profiles. Four stellarators are considered: TJ-II, a shearless flexible heliac, CHS and LHD, a small and a large heliotrons with shear, and HSX a quasihelically symmetric device. Transport barriers are created by low order rationals in LHD and TJ-II in plasma core or at the edge, being the appearance of a positive and sheared electric field, Er, the key ingredient. Hence, it is demonstrated that low order rationals are not always deleterious but can be beneficial. The evolution of Er in CHS and TJ-II shows the onset of a bifurcation, triggered by the rational or by the change from ion to electron root. The effect of viscosity on Er is explored in HSX configurations with different magnetic ripples and the effect of island dynamics on barriers is studied in TJ-II and LHD.

Francisco Castejón
CIEMAT

Date submitted: 15 Jul 2005 Electronic form version 1.4