Abstract Submitted
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Unusual Magnetic Fields of Uranus and Neptune W.J. NELLIS, Harvard University — Voyager 2 discovered the unusual non-dipolar and non-axisymmetric magnetic fields of the Ice Giants Uranus and Neptune (U/N) in the 1980's. The cause of those unique fields has been a major scientific question ever since. The answer lies in physical properties of fluids that generate planetary magnetic fields by dynamo action: convecting, electrically conducting fluids at high pressures P and temperatures T. Properties of fluids at planetary P/Ts are measured under adiabatic shock compression and quasi-isentropic multiple-shock compression up to a few 100 GPa and several 1000 K. Dynamic-compression and Voyager 2 data measured over three decades indicate (i) There is little "Ice" in the Ice Giants. (ii) Magnetic fields of U/N are made by metallic fluid H close to outer planetary radii. (iii) Thus, it is reasonable to observe non-dipolar non-axisymmetric fields. (iv) Those fields are probably caused by decoupling of rotational motion of U/N from convective motions in their dynamos, unlike Earth with strong coupling between those motions and a dipolar field [1]. The full paper on this work is published [2].

[1] R. Hide et al, *Geophysical Monograph* 76, IUGG Vol. 16;
[2] *Mod. Phys. Lett. B* **29**, 1430018 (2014).

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