

GENERATION OF THE TRANSPOLAR POTENTIAL

RAMON LOPEZ ¹ , Robert Bruntz ¹, Elizabeth Mitchell ¹, Michael Wiltberger ²

1. Department of Physics, University of Texas at Arlington, Arlington, TX, 76019, USA

2. NCAR/HAO, Boulder CO, 80301, USA

As the solar wind flows past the magnetosphere it generates a potential drop across the polar ionosphere known as the transpolar potential. This potential is communicated to the magnetosphere, driving magnetospheric convection. Generally it is assumed that there are two sources for the transpolar potential: magnetic reconnection and a viscous interaction. In this talk I will examine the generation of the transpolar potential and present an explanation as to why the reconnection potential has a nonlinear response to increases in the solar wind magnetic field, which leads to a saturation of the potential. I will also point out the importance of the closure of magnetic shear generated at the bow shock and why this leads to a source of ionospheric convection that is generated neither by reconnection nor by the viscous interaction. Instead, solar wind mechanical energy extracted at the bow shock is directed deposited into the ionosphere in the polar cap, driving ionospheric convection.

Magnetosphere, Ionospheric Potential, Simulations

Ramon E. Lopez, Department of Physics, University of Texas at Arlington, Arlington, TX, 76019, USA, +1-817-272-0386, relopez@uta.edu