Outline

- Magnetosphere
- Ionosphere
- Energy Dissipation Methods within the Ionosphere
- Coupling Processes
Ionosphere

Layers of Earth’s atmosphere where solar radiation has ionized particles.
**Coupling Processes**

**Magnetosphere-Ionosphere Coupling** refers to the processes which interconnect the lower-altitude, solar-produced, ionospheric plasma with the energized plasmas and mechanisms of the high-altitude magnetosphere.

- **Solar Energy**
  - Transports and stores energy

- **Magnetosphere**
  - (transports and stores energy)
  - Regulates FACs

- **Ionosphere**
  - (dissipates energy)
FACs
(or Field-Aligned Currents)

- **Substorm Current Wedge**
  - Develop during substorms
  - Divert from Tail current

- **Region 1 Currents**
  - Magnetosphere boundary layer to Ionosphere

- **Region 2 Currents**
  - Plasma Sheet to Ionosphere
Energy Dissipation Methods within the Ionosphere

Upward FACs are carried by downward electrons
Energy Dissipation Methods within the Ionosphere

- **Joule heating**
  - Raises neutral and plasma temperatures

- **Momentum Exchange**
  - Imparts ion motion to neutral gas
  - Modifies neutral winds

- **Poynting Vector**
  - Transfers electromagnetic energy flux to ionosphere from magnetosphere
Ionospheric Changes

- Plasma Outflow
- Conductance
  - Pederson Current and Conductivity
    - Closes FACs in the ionosphere
    - Regulates the amount of current
The Magnetosphere-Ionosphere system works like a circuit, with the Magnetosphere providing the energy and the Ionosphere providing the resistance.

The Magnetosphere and Ionosphere are connected by Field Aligned Currents (FACs).
Thank You

Any Questions?

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