##### Exploring the Active Sun (part 2)

From our vantage point on Earth, the sun seems very calm and reliable.

**Recent research shows that the sun is turbulent and erratic**.

The Solar and Heliospheric Observatory (SOHO)

observes the sun continuously from outer space.

(See <http://sohowww.nascom.nasa.gov/>)

**Magnetism is the key to understanding the sun**.

### Magnetism

Every magnet has a north and south pole.

Like poles

Opposite poles

**Examples** bar magnet compass needle Earth’s magnetic axis

1. Magnetism is represented by lines of **magnetic field**

Magnetic field lines show the direction a compass would point near a magnet

1. Magnetic field lines always form **loops** between the north and south

poles.

1. Magnetic fields are created by moving electric charges

**Example**: An electromagnet.

Flowing current (electric charge) in the wire creates

a magnetic field in the nail.

# Magnetism in the Sun

## Hydrogen gas atoms are free to fly around the sun.

Hot gas atoms collide and ionize—electrons are stripped off the nucleus.

**Cool atoms are stable. Hot atoms collide.**

**Electrons orbit the nucleus. Electrons escape.**

**Free electrons move and cause magnetic fields in the sun**.

**Sunspots**—cooler regions where magnetic fields pop through the sun’s surface

**Magnetic field loop**

**Sunspots are often**

**seen in pairs.**

**Sunspots**

**Hot gas cools when it gets trapped in the magnetic field lines**

**Prominences**—loops of hot gas above the photosphere

Hot, ionized atoms **travel along**

the magnetic field lines, **leaving**

the sun and **coming back** in.

**Flares**—explosions of hot gas and energy

**Solar flares, huge explosions above the photosphere, can release energy equal**

**to a billion hydrogen bombs**.

###### Magnetic field loop Loop ”snaps”

**Large field loops Energy in outer loop is**

**become unstable. released with hot, ionized gas.**