THE (MOST NOTICEABLY) RINGED WORLD...

SATURN
SATURN = KRONOS/CRONUS (CHIEF OF THE TITANS)

Children Of Cronus And Rhea

- Poseidon
- Demeter
- Hades
- Zeus
- Hera
- Hestia
Saturn has a lower (average) density than liquid water!

(...but I wouldn't recommend the experiment below...)
How did the Cassini satellite end its mission on Sept. 15, 2017?
Internal Layers of Planet Saturn

- **Molecular hydrogen**
  - Depth 250 km
  - Temperature 250 K
  - Pressure 10 atm

- **Metallic hydrogen**
  - Depth 30,000 km
  - Temperature 8000 K
  - Pressure $3 \times 10^6$ atm

- **Icy/rocky core**
  - Depth 45,000 km
  - Temperature 10,000 K
  - Pressure $10^7$ atm

  - Depth 60,000 km
  - Temperature 12,000 K
  - Pressure $1.3 \times 10^7$ atm
Saturn is warmed interally, by...

...Helmium “Rain”!
Saturn's thick, high-altitude haze layer obscures its Jupiter-like features...
SATURN’S MYSTERIOUS “POLAR VORTEX”
(...A HEXAGON ON SATURN?!)
<table>
<thead>
<tr>
<th>Ring</th>
<th>Inner Radius (km)</th>
<th>Outer Radius (km)</th>
<th>Width (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(planetary radii)</td>
<td>(planetary radii)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>67,000</td>
<td>74,700</td>
<td>7700</td>
</tr>
<tr>
<td>C</td>
<td>74,700</td>
<td>92,000</td>
<td>17,300</td>
</tr>
<tr>
<td>B</td>
<td>92,000</td>
<td>117,500</td>
<td>25,500</td>
</tr>
<tr>
<td>Cassini Division</td>
<td>117,500</td>
<td>122,300</td>
<td>4800</td>
</tr>
<tr>
<td>A</td>
<td>122,300</td>
<td>136,800</td>
<td>14,500</td>
</tr>
<tr>
<td>Encke gap*</td>
<td>133,400</td>
<td>133,700</td>
<td>300</td>
</tr>
<tr>
<td>F</td>
<td>140,300</td>
<td>140,400</td>
<td>100</td>
</tr>
<tr>
<td>G</td>
<td>165,800</td>
<td>173,800</td>
<td>8000</td>
</tr>
<tr>
<td>E</td>
<td>180,000</td>
<td>480,000</td>
<td>300,000</td>
</tr>
</tbody>
</table>

* The Encke gap lies within the A ring.
A part of Saturn's system of rings, pictured by Voyager 2 from a distance of about 3 million km (about 2 million mi). More than sixty bright and dark ringlets are seen here; different colors indicate different surface compositions.
DUSTY “SPOKES” IN SATURN’S RINGS
BUT WHAT **CREATEs ALL OF THIS** FINE-DETAILED RINGLET STRUCTURE?

...INTERACTIONS WITH SATURN’S **MOONS**!
SATURN’S MOON PAN IN THE “ENCKE GAP”
SO, WHAT'S GOING ON HERE...?
Shepherd moons keep F-ring narrow and create peculiar structures in the ring.

Prometheus (102 km across)

Pandora (84 km across)
HOW DOES THE MOON MIMAS CREATE THE CASSINI DIVISION?

...IT USES A 2:1 “RESONANCE”!