

## **Target 2: F Ring**

**Students: Cătălina Paraschiv, Adriana Mocanu**  
**School: „Tudor Vianu” National High School of**  
**Computer Science, Bucharest, Romania**  
**Coordinating Teacher: Ioana Stoica**

Saturn is the sixth planet from the Sun and the second largest in the Solar System; 62 moons orbit around it. Saturn has a 12 ring system, from which nine are continuous and three are discontinuous. The basic structure of the rings consists of particles made of rock, dust and ice, which orbit, collide and tear each other apart. Due to the Cassini probe, F ring's peculiarities were observed, as well as the objects which go into contact with its surface. We'll start by assuming that F Ring's uniqueness among Saturn's rings, given by its structure, but most importantly by its pronounced dynamics, turns the F Ring into one of the most interesting targets studied by the Cassini probe.

The first argument supporting the idea is F ring's structure. It contains a core ring, surrounded by a spiral. Its circumference measures 885.000 km. The ring is maintained by two “shepherd” moons, Pandora and Prometheus. They orbit on both sides of the ring and sustain its thin and narrow shape. Moreover, due to these moons, the rock and dust particles are kept inside the ring's orbit. On one hand, Prometheus' approach may cause dark channels, ripples and snowballs to appear in the ring. The ripples may be compared to capillary waves, which initially appear on water's surface as the wind blows. On the other hand, the moon's proximity might entail the destruction or the orbit deviation of the particles.

The second argument is the existence of snowballs. Due to the Cassini probe it has been noticed the appearance of massive objects, some as big as 800 m, near the F ring. As a result to the study of 20.000 images, 500 collisions between these objects and the ring's surface have been discovered. Their structure is icy. Thus, they have been referred to as “snowballs”. As they depart, the snowballs leave behind a trace of snow. These objects come from Prometheus. The moon is considered to be a porous, icy body, due to its low density and high reflecting power.

To conclude, F ring's constitution and its interaction with other particles require to be studied, given that it has spectacular characteristics compared to the other rings. Although narrow, the ring has a high activity. Thus, it might be one of the most dynamic rings in the system, its activity consisting mainly of the collisions between the icy particles and the ring's surface. By further analysis of the evolution of dust particles, new information regarding the evolution of the Solar System may be found out.

