Iron in Sun

Why in the news?

New research is finding that theories of atomic physics have underestimated iron's contribution to the sun's temperature profile.

- **Iron in Sun -** Iron (Fe) makes up about *0.14% of the Sun's mass*, which is a small fraction compared to hydrogen (~74%) and helium (~24%).
- **Location -** Iron is found mostly in the *Sun's core and outer layers (photosphere, corona)* in ionized forms.



- **Source -** Iron in the Sun comes from *nucleosynthesis in earlier generations of stars*, which exploded as supernovae and contributed elements to the solar system.
- **Role in Opacity -** Iron plays a crucial role in *absorbing and scattering radiation*, influencing energy transfer within the Sun.
- **Role in Temperature Profile -** Iron opacity affects *temperature, density and fusion rates* inside the Sun.
- So, the new findings of higher opacity of iron in the sun impacts the present solar models.

Composition of the Sun		
Element	**By Mass (%)**	**Key Role**
Hydrogen (H)	74%	Primary fuel for nuclear fusion, produces energy.
Helium (He)	24%	Fusion product, contributes to Sun's stability.

Oxygen (O)	~0.8%	Influences solar opacity, involved in energy transport.
Carbon (C)	~0.3%	Important in nucleosynthesis, affects opacity.
Neon (Ne)	~0.2%	Present in the solar atmosphere, influences radiation absorption.
Iron (Fe)	~0.14%	Major contributor to opacity, affects energy transfer.

Reference

The Hindu | iron inside the sun is more opaque than expected

