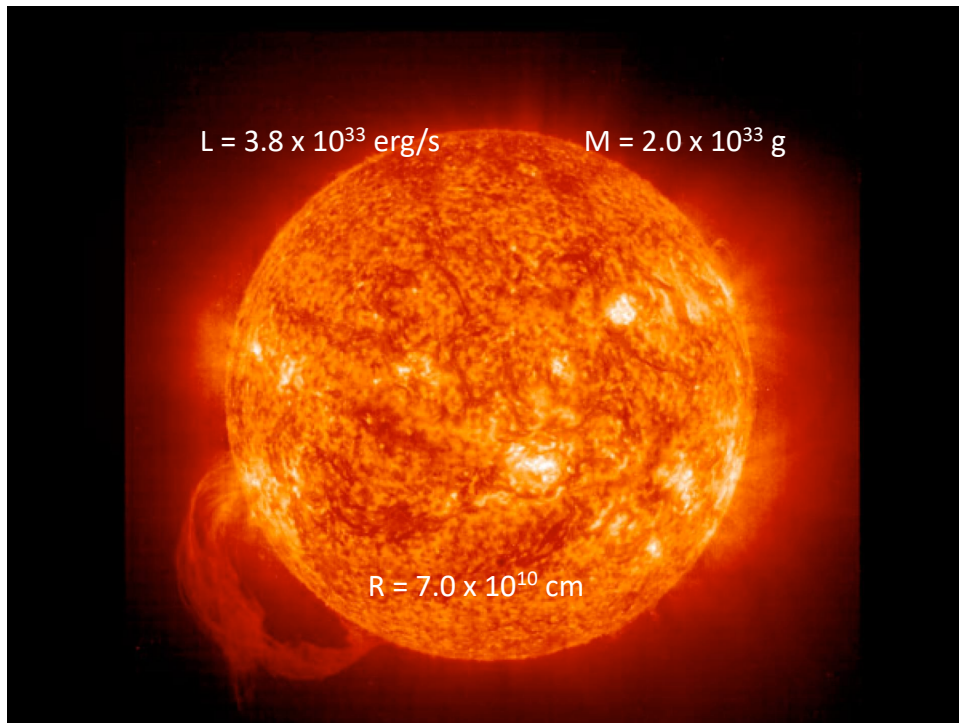


### Major isotopic systems used as radioactive clocks

Parent isotope	Daughter	Half-life (years)
Carbon (C)-14	Nitrogen (N)-14	5,730
Aluminum (Al)-26	Magnesium (Mg)-26	740 thousand
Iodine (I)-129	Xenon (Xe)-129	17 million
Uranium (U)-235	Lead (Pb)-207*	704 million
Potassium (K)-40	Argon (Ar)-40	1.3 billion
Uranium (U)-238	Lead (Pb)-206*	4.5 billion
Thorium (Th)-232	Lead (Pb)-208*	14 billion
Rubidium (Rb)-87	Strontium (Sr)-87	49 billion

*Note:* Parent isotopes in the top part of the table are extinct: the entire quantity that was present in the Earth when it formed, 4.55 billion years ago, has decayed. Decay of the uranium and thorium isotopes (\*) yields helium (He) as well as lead.



### Fusion

$\Delta E = \Delta mc^2 = (0.029 \text{ amu} \times 1.67 \times 10^{-24} \text{ g/amu}) \times (3 \times 10^{10} \text{ cm/s})^2$   
 $\Delta E = 4.3 \times 10^{-5} \text{ erg} \times 1 \text{ MeV} / 1.602 \times 10^{-6} \text{ erg}$   
 $\Delta E \sim 27 \text{ MeV}$

4 Hydrogen nuclei

$\Delta m = 0.029 \text{ amu}$

Helium nucleus