

At the heart of stars

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The Sun / credit : NASA/ESA/SOHO/EIT/Ciel et Espace

Thermonuclear blazes, particle factories... the stars constantly send an unbelievable number of messengers! While only the light coming from the stellar surface is accessible to our telescopes, some particles such as neutrinos are coming directly from the hearts of stars, enabling us to unlock the deepest of their secrets.

View into the BOREXINO detector / credit: Borexino collaboration/INFN/ASPERA

Interacting weakly with matter, electrically neutral and with a tiny mass, millions of cosmic neutrinos cross us constantly. Shielded from the radiation produced by many other particles, the Borexino experiment hunts neutrinos coming from the sun, at the bottom of an underground laboratory. Unlike photons, which come out from the star only after a long bumping process that can last one million years, neutrinos escape almost instantaneously from the Sun and inform us about the thermonuclear reactions which created them. This kind of experiment also allows the study of neutrinos which are born in the centre of the Earth by radioactive decay, and their mysterious properties, such as their flavour change called oscillation.