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Search for cosmic dark matter particles

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Upper:
Ourselves and
surrounding
materials which
consist of atoms.

Left: The highly
radiopure NaI(Tl)
scintillator named
PICO-LON.

Content:

We search for the particle candidates of cosmic dark matter by means of an inorganic crystal scintillator. The well-known atoms (Upper Picture) accounts for only 5% of the components of the Universe. The other part of the Universe consists of unknown dark matter (23%) and unknown dark energy(72%). Many candidates of the dark matter are proposed by various theories which describes beyond-standard theory.

Our project to search for dark matter named PICO-LON aims to find particle candidates for cosmic dark matter by means of a large volume and highly radiopure NaI(Tl) crystal. NaI(Tl) is highly sensitive to various candidates of dark matter particles.

The dark matter experiments are needed to be performed under extremely low background environment: the expected event rate is less than a few events per day. Our laboratory has developed a highly radiopure NaI(Tl) detector whose impurity was lowest in the world (Lower Picture).

We are developing a larger (total mass of 1 ton) and purer NaI(Tl) scintillator to construct the dark matter search detector PICO-LON (Pure Inorganic Cystal Observatory for Low-background Neutralino).

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