

VOXES, a new high resolution X-ray spectrometer for low yield measurements in high background environments

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The VOXES projects goal is to realise the first prototype of a high resolution and high precision von Hamos X-ray Spectrometer, using Highly Annealed Pyrolytic Graphite (HAPG) crystals combined with fast and triggerable position detectors.

The aim is to deliver a cost effective system having an energy resolution at the level of eV for X rays energies from about 2 keV up to tens of keV, able to perform sub-eV precision measurements, able to work also in high background environments.

VOXES will compete in performances with the newly developed Transition Edge Sensors (TES), which achieve eV resolution measurements for X rays of few keV, with the drawback that TES have high costs, extremely reduced active area, rather long recovery time and are difficult to be handled, due to the massive cryogenic system needed. VOXES spectrometer will have a reduced cost, a bigger active area, higher efficiency and will be easier to handle.

The VOXES system will be qualified by performing measurements of exotic atoms at the PSI laboratory and/or DAFNE and/or J-PARC laboratories. There are many applications of the proposed spectrometer, going from fundamental physics (precision measurements of exotic atoms at DAFNE collider and J-PARC; precision measurement of the K - mass, solving the existing puzzle; quantum mechanics tests) to synchrotron radiation and X-FEL applications, astronomy, medicine and industry.

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