

Imaging of color center tracks in lithium fluoride at UZH

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Lithium fluoride (LiF) is a promising candidate for low-energy nuclear recoil detection with color centers. It exhibits relatively low sensitivity to ionizing radiation and the light lithium and fluorine nuclei enhance the sensitivity for spin-dependent low-mass dark matter and neutrino detection. Particle-induced color center tracks can be read out by selective plane illumination microscopy (SPIM) with well-separated excitation and emission wavelengths in the visible spectrum.

At the University of Zurich, the open-source light-sheet fluorescence microscope mesoSPIM allows for the readout of samples with volumes of tens of cubic centimeters. Recently, fast-neutron tracks, fission tracks from thermal neutron capture on ${}^6\text{Li}$, and track candidates from cosmic rays could be identified within cm^3 -size samples and were analyzed quantitatively. This marks an important stepping stone towards larger practical detectors for dark matter searches, neutrino detection at nuclear reactors or sensitive neutron detection. The contribution will present recent results, show the imaging process and lay out the analysis techniques for three-dimensional tracks.

Do you plan to give the talk in person?

No

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