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Fine-grained nuclear emulsion as higher resolution tracking detector

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Nuclear emulsion is a kind of photographic film and very high resolution tracking detector. We propose the directional dark matter search project with the nuclear emulsion. It is possible to make the large mass detector which sensitive to direction
. However, solid tracking detector is very difficult to detect the nuclear recoil tracks induced by dark matter because the track length in solid becomes less than 1 micron. This length cannot be detected even with the standard nuclear emulsion. Here, we developed the fine-grained nuclear emulsion as new detector. As the fine-grained nuclear emulsion has the resolution of less than 1 micron, it is possible to detect the nuclear recoil tracks. In addition, the new technique to read out the very short length tracks was also developed.
In this talk, I will report the R&D status of fine-grained nuclear emulsion technique, the directional dark matter search project with nuclear emulsion and other application.

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