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μ^-SR HOWTO: Tricks for Negative Muon Spin Rotation/Relaxation

Most μSR is done with the μ^+ because 100% polarized surface muons have a fixed lifetime and usually retain their full polarization upon stopping in the sample, whereas the μ^- has higher energy, loses most of its polarization through LS coupling during its cascade to the ground state of the muonic atom, and is then subject to capture on the nucleus, so its lifetime is variable and often very short. However, μ^-SR offers unique information of various kinds and is often essential. I will describe some "tricks" that might make μ^-SR more practical – some of which (like looking at nonzero-spin nuclei) are "tried and true", and some of which are more speculative (like measuring the energies of muonic X-rays to identify the muonic atom or even select events following a specific transition).

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