

Electron Beam Requirements for HDice target tests in the Injector Test Facility Upgrade

Parameter	Range	Remarks
Energy	$E_{\text{Beam}} \geq 5 \text{ MeV}$	
Current	$100 \text{ pA} \leq I_{\text{Beam}} \leq 2 \text{ nA}$	
Beam size	$50 \text{ } \mu\text{m} < \sigma_{x,y} < 150 \text{ } \mu\text{m}$	as small $\sigma_{x,y}$ as possible is preferred
Energy Spread	$\sigma_E/E < 10^{-3}$	
Polarization	$\geq 70\%$	Longitudinal only, after two 45° bends up to the HDice IBC (which should ~ cancel precession); transverse polarization is not required
Helicity Flip Rate	1 – 30 Hz	
Frequency of Polarization Measurement		Every 4 hrs. in the beginning. As confidence builds up that polarization is stable, once every 2 days.
Beam Halo	$< 10^{-4}$	At 1 mm from beam center at the target
Beam position stability	contained within one $\sigma_{x,y}$	