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Development of a Radial Electric Field Diagnostic for LTX Using the Stark Effect FRED LEVINTON, Nova Photonics, Inc, RICHARD MAJESKI, Princeton Plasma Physics Laboratory, ETHAN SCHARTMAN, Nova Photonics, Inc — The Lithium Tokamak eXperiment (LTX) is investigating confinement and transport in the low-recycling regime of tokamak discharges. A liquid lithium coated shell reduces recycling of particles into the plasma by up to 90% versus highly recycling walls. Power flow in the edge region is dominated by convection. By reducing the number of particles transporting energy to the wall, the energy per particle must be higher for a constant input power to the plasma core. Therefore a large edge temperature gradient is expected to form in low recycling plasmas. As a consequence of electron force balance, the temperature gradient will produce in LTX a radial electric field of $E_r \sim 100$kV/m. Nova Photonics, Inc is developing a high spatial-resolution measurement of E_r using Stark splitting of Balmer emission of a diagnostic neutral hydrogen beam. The beam will be injected nearly perpendicular to LTX's toroidal magnetic field with viewing sightlines nearly parallel to the field. This geometry will optimize sensitivity to the radial electric field. The design of the diagnostic and estimates of its performance will be presented.

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