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Glints of light reveal properties of coiled electrospinning jets in flight DARRELL H. RENEKER, KAIYI LIU, The University of Akron — Optical observations of jets provide information needed to control features of polymer nanofibers produced by electrospinning. Quantitative information about the location, vector velocity, and rotation of selected segments of the multiply coiled path of an electrospinning jet of polymer solution was provided by a combination of videography, stereography, and stop motion flash photography. Visual observations of a jet depend largely on glints of incident light that are specularly reflected from particular places on the multiply coiled jet path. The traces of moving glints bifurcate when a new turn is added to a coil, at an observed rate of 600 turns per second. The polarization of light, in glints reflected at Brewster's angle, allows measurement of the index of refraction of the fluid in a jet, in flight. Strategic placement of lights to either illuminate, or leave dark, parts of the coils, make both the handedness and changes in handedness of the electrical bending coils apparent to visual observation. The changes occurred at intervals of a few seconds in our experiments. Evidence was found, in the form of ribbon-like glint traces that were polarized, for the occurrence of undulations on the surface of some jets.

Darrell H. Reneker
The University of Akron

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