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Two-Dimensional Capillary Array Electrophoresis End-Column Fluorescence Detection

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Ultrahigh-throughput (>5000 capillaries) electrophoresis will require innovative detection methodologies. Current scanning detectors are limited by duty cycle, while in most imaging detectors, laser intensity is attenuated by reflection and refraction at capillary walls. Previous work [Dovichi 2001] in 2-D capillary array detection which avoids these problems cannot scale to such large arrays due to limitations in laser power, detector area, and lens diameter. We report on a novel 2-D array fluorescence detection methodology that overcomes these limitations. The key features of the system include an LED array, lenslet array, and impact-ionizing CCD detector. The wide-field LED array can scale in area indefinitely to provide the excitation illumination. An injection-molded acrylic lenslet array increases the field intensity by >250,000X and subsequently collects emission with a 0.31 NA (up to 0.7 NA demonstrated). The CCD utilizes impact ionization technology to achieve 3 frames/second sampling rate with S/N>10.

Presentation preference An Oral presentation is requested
I am requesting a student travel stipend.
Requested Session: Detection methodologies

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