single point polymorphisms or single point mutations, linearity requirements significantly limit detection dynamic range.

In the present paper we discuss two mechanisms of SPD nonlinearity caused by a finite temporal resolution of associated electronic circuitry. Depending on the design of the SPD pulse amplifier and photon counter, nonlinear behavior of the SPD can be described by a delay time either depending or independent on a measured count rate. Based on experimental measurements and computer simulations we have developed methods for characterization of circuit delay time and implemented an algorithm for digital correction of a registered photon count for both nonlinearity types. The algorithm was tested for various single photon detectors. Experimental results show that the proposed algorithm is very accurate for compensation of up to 50% non-linearity.

P431-T
ULTRASENSITIVE COMPACT SYSTEM FOR CHIP ELECTROPHORESIS WITH LOW-COST SINGLE-PHOTON AVALANCHE DETECTORS
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Ultra-sensitive, miniaturised and economical photosensors are a key issue in compact systems for fast DNA fragment separation.

Planar Silicon Single-Photon Avalanche Diodes (SPAD) developed in this laboratory have advantages over other detectors (Photo-Multiplier Tubes PMT, Single-Photon Counting Modules, etc.). They are smaller, rugged and reliable and operate with low voltage and low power dissipation. They are fabricated at low cost and high yield with technology compatible with integrated circuits and monolithic detector arrays. Previous work on a preliminary chip electrophoresis set-up demonstrated their suitability [HPCE2001, Boston, USA].

We introduce here a new, compact and versatile analytical instrument with laser diode for fluorescence excitation, compact input and output optical systems, separation chip with controlled temperature and controlled high-voltage supplies, two SPAD sensors for dual-wavelength operation. The operation is fully automated under PC control. Sensitivity better than 10pM with injection volume 50pL is achieved in the separation of CY5 DNA labeled fragments.