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A novel Transient-Current-Technique based on 2-Photon Absorption in Diamond

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A novel femtosecond laser based Transient Current Technique (TCT) to probe the charge transport properties of single crystalline Chemical Vapor Deposition (sCVD) diamond sensors will be presented. In this method, the laser beam with the wavelength of 400 nm and pulse duration 30 fs enters the diamond through a polished edge (hence Edge-TCT or E-TCT) and is focused inside the bulk at a known position. The dimensions of the focus point limit the size of the voxel in which charge carriers are produced by multi-photon absorption. We record the time-dependent current response of the drifting electrons and holes. This allows probing the electric field and charge carrier movement inside the bulk in a way that was not possible before.

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