Passivated tunneling contacts for c-Si solar cells

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bias under interband femtoseconds laser photoexcitation at room temperature. The detected THz radiation is attributed to the excitation of time-varying dipole moment induced by polarization of non-equilibrium electron–hole pairs in QWs. Noticeable sub-linearity in the dependence of THz amplitude on excitation density is observed. A theoretical model, which accounts for the dynamic screening of the electric field in wide GaAs QWs by nonequilibrium carriers, has been developed. The model describes well the properties of the observed THz signal.

The idea presented in the article is to deposit a stack consisting of an Al₂O₃ and ZnO layer on the silicon. The holes separated from the electrons at the junction can tunnel through the Al₂O₃ into the transparent conductive ZnO where they are collected with minimal energy loss when the Al₂O₃ charge density and ZnO doping density are properly tailored. Using atomic layer deposition, it was demonstrated that Al₂O₃ and Al-doped ZnO films deposited with sub-nanometer precision can be used for this purpose with sufficiently high tunneling currents when the Al₂O₃ is about 1-2 nm thick.

**APPLIED PHYSICS**

**Passivated tunneling contacts for c-Si solar cells**

Al₂O₃ nanolayers are well-known for their ability to reduce recombination losses at crystalline silicon surfaces, making Al₂O₃ an attractive material for passivation of the next-generation high efficiency solar cells. In this work, we try to take the application of Al₂O₃ one step further: when Al₂O₃ is deposited on n-type silicon, a high concentration of holes accumulates at the surface due to the high density of negative charges in the Al₂O₃. Consequently a pn-junction is formed which can replace the traditional front side p-doped region made by high temperature diffusion.

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**PARTICLE PHYSICS**

**Dissecting deuteron Compton scattering I**

The electromagnetic polarisabilities of the nucleons characterise their responses to external fields. The simplest are the electric and magnetic polarisabilities that describe the induced dipole moments. For spin-1/2 particles there are also four spin polarisabilities, analogous to rotations of the polarisation of light by optically active media. The best experimental window on them is Compton scattering of photons, which has provided good determinations of the electric and magnetic polarisabilities of the proton. Future experiments with polarised protons will give access to its spin polarisabilities. In contrast, much less is known of about the neutron since it does not exist as a stable target. Nonetheless, its properties can be obtained from Compton scattering on light nuclei, most notably the deuteron -- a weakly bound proton and neutron. A new generation of experiments is planned to provide beams of polarised photons on targets of polarised deuterons. If the spins of the final particles are not observed, there are 18 independent observables. This work provides,