

Light-Induced Metastable Defects in Amorphous Silicon

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The recent uproar in photovoltaic research renewed the interests in light-induced metastable defects in amorphous silicon, also known as the Staebler-Wronski effect. In this talk, I will review some of the theoretical work we have done in the past to illuminate this interesting but also very challenging problem. In particular, I will discuss the model where two photo-excited mobile hydrogen atoms meet each other to form a metastable complex, for example, at the vacancy sites of the network, that leave two separated dangling bonds in the system to act as recombination centers for photogenerated carriers. I will also discuss how the creation of topological defects in the lattice can be an alternative for the di-hydrogen traps. Other available models will also be critically discussed in light of the experimental literature.