Contribution ID: **372** Type: **Plenary**

Black silicon and the quest for intermediate band semiconductors

Thursday, 21 May 2015 11:00 (1 hour)

Shining intense, ultrashort laser pulses on the surface of a crystalline silicon wafer drastically changes the optical, material and electronic properties of the wafer. The resulting textured surface is highly absorbing and looks black to the eye. The properties of this 'black silicon' make it useful for a wide range of commercial devices. In particular, we have been able to fabricate highly-sensitive PIN photodetectors using this material. The sensitivity extends to wavelengths of 1600 nm making them particularly useful for applications in communications and remote sensing.

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Session Classification: Plenary