Bright blackbody

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An ideal blackbody absorbs all light impinging on it, and it radiates electromagnetic waves with a broad spectrum that depends only on the temperature. Conversely, a white object is characterized by a finite reflectance to visible light, hence being the opposite of a blackbody. Challenging this concept, here we find that various substances exhibit strong optical absorption capabilities like blackbodies when exposed to intense light, despite appearing pure white in the sunlight. We name this phenomenon photoinduced blackbody effect. Under near infrared light, the photoinduced blackbody effect is accompanied by photon avalanche optical frequency conversion and optical bistable luminescence. Namely, the energy states and absorption properties of the samples are modified under strong laser irradiation. The modified absorption transitions cause the switch of the sample from a quasi-whitebody into a quasi-blackbody via an avalanche mechanism. At the same time, the sample emits a broadband electromagnetic radiation, becoming a bright blackbody.

Short Bio:

Weiping Qin received his PhD degree in condensed matter physics from Changchun Institute of Physics, Chinese Academy of Sciences, China. He is a professor of Jilin University.