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Effect of the anisotropy factor of scattering and the finite spatial coherence length of light source on enhanced backscattering P. PRADHAN, YOUNG KIM, HARIHARAN SUBRAMANIAN, YANG LIU, VADIM BACKMAN, Northwestern University, Evanston, IL 60208 — Enhanced backscattering (EBS) of light (also known as coherent backscattering) is a constructive self-interference effect in the backscattered direction due to the photons traveling along time-reversed paths in a disordered medium. EBS can be used for characterization of disordered media and recently been used in cancer detection. Conventional EBS is determined by the scattering transport mean free path of the medium. However, the properties of EBS become more complex and richer in case of anisotropy of scattering (anisotropy factor g>0) and finite spatial coherence length (Lsc) of a light source. We report our experimental and numerical studies of the effects of g and Lsc on EBS. We demonstrate for the first time that the profile of the EBS peak varies non-monotonically with mean free path length ls, and is a double valued function of ls for a range of values of Lsc and g. Hence, the value of g can be extracted from the EBS profile, which may provide important and previously unattainable information about biological tissue in situ.

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