EUV characterization of (P43/P46) phosphor coated FSI CMOS image sensors for solar observations

S.Gissot
Royal Observatory of Belgium

Front-side illuminated (FSI) CMOS image sensors (CIS) coated with phosphor layers are considered as a reliable technology for EUV observations of the solar atmosphere. P43 and P46 phosphor coated CIS were characterized in the EUV at PTB/BESSY II to assess their performance as flight model backup candidates for the Extreme Ultraviolet Imager (EUI) of the future Solar Orbiter spacecraft. Their main characteristics including spectral response, energy conversion efficiency, phosphor yield, and spatial noises such as photo-response non-uniformities (PRNU) were measured and compared to back-side illuminated (BSI) CIS technology. Phosphor yields were systematically under-estimated when the ratio of phosphor decay time to integration time could not be assumed to be negligible (e.g., for P43) and this was adequately explained using a doubly stochastic Poisson point process. We also report the degradation effects caused by high flux and high energy (1 nm) photons.