PHOTON TEMPERATURES OF HARD X-RAY EMISSION OF LHCD PLASMAS AND CURRENT DRIVE EFFICIENCY IN THE HT–7 TOKAMAK

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A detailed study of photon temperatures (T_{ph}) of hard X-ray emission in the lower hybrid current drive (LHCD) plasmas is presented. The photon temperature increases with increasing plasma current while it decreases with increasing plasma density. In lower hybrid power and phase scan experiments; there is no appreciable change in the photon temperature. The numerical results based on the ray-tracing calculation and Fokker-Planck solver can give reasonable explanation of the experimental observation. Both experimental and numerical results reveal that photon temperature depends mainly on global effects of the fast electron population, synergy between the fast electron and the loop voltage and the coulomb slowing down. The Current drive efficiency and correlation with photo temperature are investigated for wide range of plasma current, density and lower hybrid power scan experiment. Heating efficiency is also investigated in plasma density scan experiments.