Observations of the magnetic coherent mode induced poloidal redistribution of divertor particle flux in EAST

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The effect of the magnetic coherent mode (MCM) [1-3] on edge particle transport has been investigated, via surveying the correlation between the intermittent events of the mode with the variations in the ion saturation current densities measured by divertor Langmuir probes. According to the conditional analysis results, large bursts in the series of MCM amplitude correlates with only a very small net increase of total particle flux deposited on the upper outer divertor targets. This seems to be consistent with the observed weak electrostatic fluctuations driven by the mode, which can thereby result in a very small fluctuation-induced cross field particle transport. In addition, here we also report a novel observation of the notable poloidal redistribution of divertor particle flux accompanying with the large bursts of MCM amplitude. Such a redistribution can result in a moderate flattening of poloidal distribution of the particle fluxes deposited on divertor plates, with the peak flux reduced by ~ 20%. Further analysis suggests that such a MCM-induced poloidal redistribution of divertor particle flux appears to be correlated with a decrease of divertor particle flux in the vicinity of the striated particle flux (SPF) [4] driven by high power lower hybrid wave (LHW), whereas an increase in the original strike zone (OSZ) [5]. This finding implies that the LHW-induced edge magnetic topology changes [6] might be degraded by the MCM.

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