L-mode heat flux scaling at tokamaks JET, EAST and COMPASS at vertical and horizontal divertors

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Established scalings of divertor target power decay length are based on infra-red thermography (IR) which cannot access the JET vertical targets. This paper presents experiments in tokamaks JET, EAST and COMPASS, aiming at enlarging the span in scaling parameters and in case of JET for configurations with the strike points at ITER-relevant location - the vertical divertor targets. We analyzed hundreds of Langmuir+ball-pen probe divertor profiles, described principally by the plasma radial decay length 1 mm$< \lambda_q^{omp} <$15 mm. The data set contains L-mode, 2.5$< q_{95} <$8, 1.7$< \overline{n_e}[10^{19}\mathrm{m}^{-3}] <$9 and plasma current 0.15$< I_p[MA] <$3. λ_q^{omp} with errors below 50% are only taken into account; especially some of the JET inner target profiles are removed due to magnetic shadowing. Cross-checking with IR camera shows difference, however, within the error bars. Previously published scaling seems consistent with those new divertor probe data from JET, COMPASS and EAST at both bottom horizontal and outer vertical targets. This is probably because the edge plasma density is nearby the inner/outer divertor symmetry point. We look for a new scaling taking into account all these aspects.