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P4.1077 ICRF heating with poloidally phased antennas

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The ITER ICRF system is designed such that there is a 90 degree phase shift in the currents between the upper and lower rows of antenna straps. The consequences of this design has previously been studied from the point of view of the coupling, but not with respect to plasma heating. In this work the effects of poloidal phasing on the core plasma heating, as well as the coupling, is studied for the ITER, JET and WEST tokamaks. The work is carried out with the new ICRF wave solver FEMIC. We show that poloidal phasing cause destructive interference near the equatorial plane between the waves launched from the upper and lower antennas, which may modify the central heating and the coupled power. A difference has been identified between the coupled ICRF power for 90 and -90 degree phase difference between the two antennas halves. We show that this difference is due to the plasma gyrotropy and that it depends sensitively on the pedestal parameters.

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