The low aspect ratio spherical tokamak is attractive because of its potential to achieve high beta operation. To fully exploit this, and maximise economic attractiveness, operation above the no-wall $\beta$-limit is desirable, thus requiring either passive or active stabilisation of the Resistive Wall Mode (RWM). The achievable high-$\beta$ in the ST makes operation with a large fraction of the plasma current driven by the bootstrap mechanism possible. This tends to cause broad toroidal current profiles with core safety factors, $q>\sim 2$. It is found that such ST plasmas achieve with-wall normalised beta-limits of $\beta_N \sim 5$ to 6, with a corresponding no-wall $\beta_N \sim 3$ to 4, optimisation studies show the achievable $\beta_N$, with a wall, scales inversely with the pressure peaking, while the no-wall $\beta_N$-limit primarily has a linear dependence on $l_i$. Since the fusion power $\sim \beta_N^2$, operation above the no-wall limit (where the RWM must be controlled) can lead to significant gains in fusion power.

The two dominant mechanisms for passive stabilisation of the RWM are toroidal plasma flow and kinetic resonances with thermal particles or fast ions. To assess these effects, modelling has been performed using the MHD-kinetic hybrid code MARS-K[1], which includes the effects of drift kinetic resonances. It is found that while the alpha particle resonance has only a weak stabilising effect, the thermal ion precessional drift resonance has a more substantial stabilising effect ($\sim 20\%$) on the $n=1$ RWM. It is also important to study active control of the RWM, to supplement passive stabilisation and improve the robustness of high-$\beta_N$ scenarios. MARS-F[2] is used to model a feedback scheme with active outboard $n=1$ saddle coils, sufficiently far from the plasma to be shielded from 14 MeV neutrons by a blanket structure. A sensor coil measuring the $n=1$ poloidal field from the RWM is located on the midplane at the same major radius as the active coils. In order to achieve robust stabilisation of the RWM, it has been found necessary to have a dominantly proportional feedback scheme, but including a weak derivative term. The derivative term makes the scheme more sensitive to system noise. But with white noise included in the model at a realistic level, full suppression of the RWM is still achieved.

Results on optimising the RWM feedback scheme, including full drift kinetic effects, will be presented to demonstrate the feasibility of robustly realising the full high-$\beta$ potential of the spherical tokamak.

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