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A Stepladder Approach to a Steady State Tokamak Fusion Power Plant HARTMUT ZOHN, ALEXANDER BOCK, EMILIANO FABLE, JOERG STOBER, FREDERIK TRAEUBLE¹, MPI fuer Plasmaphysik — In the EU strategy to an FPP, DEMO is the single step between ITER and an FPP. It is not obvious how to arrive at a DEMO design point in this strategy. We propose to avoid large scenario development steps in an ITER-DEMO-FPP step-ladder, since no other machines can qualify the scenarios. Thus, DEMO becomes a technology demonstrator, not a plasma physics experiment. We characterize the plasma scenario in terms of the quantities β_N , q , H and f_{GW} . To ensure adequate divertor performance, constant n_e is chosen. Different from previous approaches, ρ^* and ν^* will vary throughout the stepladder based on physics arguments that below minimum values, their variation is no longer important. This leaves open the choice of machine parameters A, R and B. Fixing A to the ITER value, constant f_{GW} and absolute n_e lead to $B/R = \text{const}$. At constant q , β_N and A, B and R increase proportional to $P_{fus}^{1/7}$ in the stepladder. The power needed to drive the current in steady state varies similarly, so from DEMO to an FPP a significant decrease in recirculating power fraction occurs. A viable divertor solution and access to H-mode are considered explicitly. An example for such a stepladder is discussed, based on recent ASDEX Upgrade results in steady state.

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