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Who will save the tokamak – Harry Potter, Arnold Schwarzenegger, or Shaquille O'Neil? J. FREIDBERG, F. MANGIAROTTI, J. MINERVINI, MIT Plasma Science and Fusion Center — The tokamak is the current leading contender for a fusion power reactor. The reason for the preeminence of the tokamak is its high quality plasma physics performance relative to other concepts. Even so, it is well known that the tokamak must still overcome two basic physics challenges before becoming viable as a DEMO and ultimately a reactor: (1) the achievement of non-inductive steady state operation, and (2) the achievement of robust disruption free operation. These are in addition to the PMI problems faced by all concepts. The work presented here demonstrates by means of a simple but highly credible analytic calculation that a "standard" tokamak cannot lead to a reactor – it is just not possible to simultaneously satisfy all the plasma physics plus engineering constraints. Three possible solutions, some more well-known than others, to the problem are analyzed. These visual image generating solutions are defined as (1) the Harry Potter solution, (2) the Arnold Schwarzenegger solution, and (3) the Shaquille O'Neil solution. Each solution will be described both qualitatively and quantitatively at the meeting.

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