Toward a Replacement for the Standard Equation of State for Water

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In 1995, the International Association for the Properties of Water and Steam (IAPWS) adopted a standard formulation for the thermodynamic properties of ordinary water in its fluid phases, valid up to 1000 MPa and 1273 K. This equation of state has become known as IAPWS-95. While the accuracy of IAPWS-95 is excellent in the regions of temperature and pressure where reliable data existed for its development, new data in the past 30 years have revealed significant room for improvement in other regions. In addition, small flaws have been identified that could be avoided with modern equation-of-state technology.

We will review the various ways in which improvement of IAPWS-95 is needed, along with the plans of an IAPWS Task Group to develop a replacement in roughly the next five years. Special attention will be given to the experimental situation, where the new data will be reviewed along with areas in which additional experiments would be desirable in order to improve the next-generation equation of state for this vital fluid.