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State of the Art in Validation for Low Temperature Plasma Simulations and Experiments

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In the end, validation of a verified code is relied upon for claiming predictivity, a critical need for plasma simulation in many areas, especially involving safety or financial consequences. Here, verification means the code has been demonstrated to behave in a correct manner (i.e., convergence), sometimes phrased “solving the equations correctly”. Validation means the code output has been shown to match experimental results, sometimes phrased “solving the correct equations”. Precisely what “predict” means, and what makes for “good” or “insufficient” validation, are subjects of debate and evolving understanding in our community. Validation is rarely performed in a strong formal manner, although some examples exist. Instead, various kinds of evidence are used (sometimes indirectly) to formulate a story of confidence in results. Stronger validation leads to more confidence. This workshop will provide experiences and opinions of experts in validation and provide examples of validation exercises, including the sometimes unanticipated large uncertainties when formalism is applied to the process.