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AN EXAMPLE FOR COMPLEMENTARITY BETWEEN PLASMA PHYSICS AND DATA-DRIVEN RESEARCH

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An example for complementarity between plasma physics and data-driven research will be reported. It is the application of the information criterion (either Akaike or Bayesian) in the field of the statistics to the data obtained in the fusion research. A particular example described in the paper is the trials being conducted by utilizing the thermal diffusivity database in the Large Helical Device (LHD), Japan. The paper will reveal that the information criterion can be a powerful tool to unravel complicated entangled phenomena in fusion plasmas, from a viewpoint different from plasma physics. By efficiently extracting the information contained in the data, which could not always be achieved only by the variables of interest based on plasma physics (physicist's view), the convincingness supported by plasma physics and/or new discoveries and awareness from the perspective of the data-driven approach can be achieved. By considering complementarity between plasma physics and data-driven approach, fusion research should be qualitatively strengthened.

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