



Contribution ID: 241 Contribution code: S1 Physics Innovation

Type: Poster Presentation

## Surveying physics laboratory skill in measurement and uncertainty: A case study of pre-service teachers and in-service teachers

In physics laboratory, an experimental result along with its uncertainty is meaningful to allow other people making judgment about the quality of the experiment. This is the important skill for high-school physics teachers. This study aimed to investigate physics laboratory skill; in particular, measurement and uncertainty. Data were obtained from pre-service science teachers, pre-service physics teachers, and in-service teachers in the academic year 2021. A measurement and uncertainty test was distributed to the participants during the laboratory class. Their responses were analyzed based on reading an estimate value and uncertainty from a measurement, giving the uncertainty from the repeated measurement, making propagation of uncertainty, and writing the final results. It was found from the test that most of the answers still lack of the concept of uncertainty and propagation of uncertainty. They wrote the incorrect answers and could not give their reasonable responses. In this work, the result will be discussed along with the future direction of the research.

Keywords: Physics laboratory skill, measurement, uncertainty, pre-service teacher

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**Session Classification:** Poster: S1 Physics innovation

**Track Classification:** Physics Innovation