



Course Catalog Number: Tem-4  
Course Track: Electrical Measurements  
Course Topic: Voltage  
Course Career Level: Intermediate

**Sunday, August 25 | 8:00 AM - 5:00 PM | 1-Day (8 Hours)**

**Course Title: Josephson Voltage Standard for Primary SI Realization**

**Instructor:** Dr. Alain Rüfenacht, National Institute of Standards and Technology (NIST)

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**Abstract:** An introduction to the operation and theory of the Programmable Josephson Voltage Standard system (PJVS). A prototype system will be running for training purposes. We will discuss the basics of Josephson Voltage Standards and the particulars of implementation in the PJVS system to realize the unit volt within the new SI. Examples of calibration measurements performed with the PJVS system will be covered, as well as best measurement practices in order to eliminate systematic errors.

**Learning Objectives:**

1. A detailed knowledge of PJVS system operation and theory.
2. Best practices for precision voltage measurement using the PJVS system.
3. Reduction of calibration uncertainties using this system.

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**Instructor Curriculum Vitae (CV):** Alain Rüfenacht received the PhD from the University of Neuchâtel, Neuchâtel, Switzerland, in 2005, for his work in collaboration with IBM Zurich Research Laboratory, on high temperature superconducting ultrathin films. In 1999, 2009, and 2010, he was a Scientific Collaborator with the Electrical Quantum Standards Laboratory, Federal Office of Metrology (METAS), Bern-Wabern, Switzerland. In 2007-2008 and 2011-2017, he was a Research Associate with the Quantum Voltage Project, National Institute of Standards and Technology, Boulder, CO, focusing mainly on the integration of Josephson junction arrays into voltage standards. Since 2017, has been a staff scientist in the Quantum Voltage Project, National Institute of Standards and Technology, Boulder.