

UNB Physics Department Seminar

The NRC-FCs2 atomic fountain clock: primary frequency standard of Canada

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The definition of SI second is based on the transition frequency of the hyperfine ground states of ^{133}Cs and is realized by primary frequency standards. The next generation of NRC's primary frequency standards, NRC-FCs2 atomic fountain clock, has been developed over the last few years. The physics package of NRC-FCs2 was built at the National Physical Laboratory (UK) based on the design of the NPL-CsF2 atomic fountain clock in a collaboration between NPL and NRC. The other experimental subsystems, such as the optical, microwave, electronics and control systems, were adapted and/or upgraded from the previous NRC atomic fountain apparatus. We recently completed the first accuracy evaluation of NRC-FCs2 fountain clock with an overall systematic uncertainty of 2.4×10^{-16} in terms of the fractional frequency, which is comparable to the best in the world. The short term stability of NRC-FCs2 is 1.1×10^{-13} at 1 second averaging time. Frequency comparisons between NRC-FCs2 fountain clock and the other primary and secondary frequency standards contributing to the steering of TAI using GPS precise point positioning method show excellent agreement. NRC-FCs2 fountain clock will be used as a primary frequency standard to contribute to the steering of TAI and to calibrate the official time scale of Canada, UTC(NRC), and other atomic frequency standards.

Thursday Sept. 26, 2019, 1:15--2:15 pm in
P204. Colloquium tea in P203 beforehand