

Abstract for an Invited Paper
for the DAMOP08 Meeting of
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**Search for Temporal Variations in Fundamental Constants Using Hyperfine Transitions in Primary Atomic
Clocks**
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We will report on recent work performed with LNE-SYRTE fountain ensemble. This fountain ensemble includes a Cs fountain FO1, a transportable Cs fountain FOM and a dual fountain FO2, operating both with Rb and Cs. These three fountains are using the same ultra low phase noise interrogation oscillator based on a continuously operated cryogenic sapphire resonator oscillator (CSO), leading to best short term fractional frequency instabilities ranging from 1.6 to 6 parts in 10^{14} . Recent work with FO2 focused on improving the rubidium part to reach accuracy similar to those achieved with Cs fountains (4 to 12 parts in 10^{16}). Recent comparisons in November 2007 with FOM show fractional frequency instability down to 3 parts in 10^{16} at 2 days. These comparisons provide new measurements of the Rb hyperfine frequency and improve the test of the variation of fundamental constants based on comparing the Rb and Cs hyperfine frequency over time. This work was performed in collaboration with Jocelyne Guena, Frederic Chapelet, Peter Rosenbusch, Philippe Laurent, Michel Abgrall, Daniele Rovera, Giorgio Santarelli, Lne-Syrte and Michael Tobar, University of Western Australia; and Andre Clairon, LNE-SYRTE-Observatoire de Paris.