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Physics

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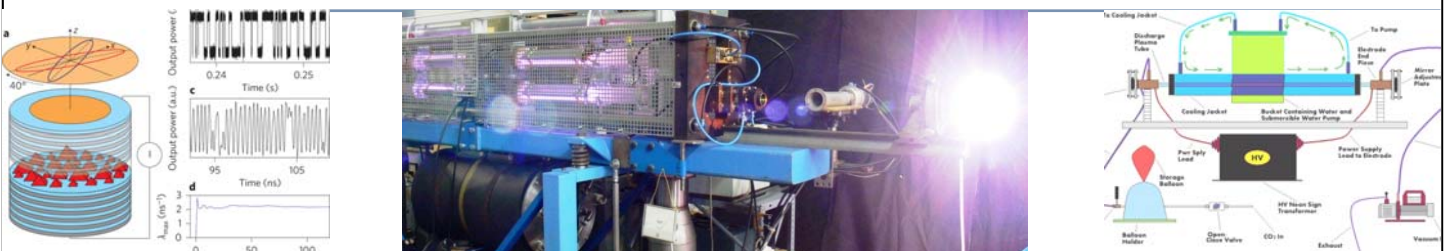
MONDAY, DECEMBER 1ST



Dr. Carlos L. Pando Lambruschini
Instituto Fisica, Mexico

4:00 PM in TH 411
Refreshments served at 3:50 PM

Mixed-Mode Oscillations in Q-Switched CO₂ Lasers



Abstract:

We consider the origin of mixed-mode oscillations and related bifurcations in some laser models that describe CO₂ monomode lasers with saturable absorbers. Our study indicates that the presence of isolas of periodic mixed-mode oscillations, as the pump parameter and the cavity-frequency detuning change, is inherent to Q-switched CO₂ monomode laser models. We compare these models (dual four-level model, 3:2 model, and a CO₂ laser model for fast saturable absorbers) and find similarities as well as qualitative differences, such as the different nature of the homoclinic tangency to a relevant unstable periodic orbit, where the Gavrilov-Shilnikov theory and its extensions may hold [1,2,3]. The models also show that when two lasers are mutually coupled via saturable absorbers, the behavior is reminiscent of half center oscillators in neurodynamics, displaying stability intervals for in-phase, anti-phase and intermediate phase solutions.