

# Columbia University Department of Physics

## High Energy Particle Seminar Series

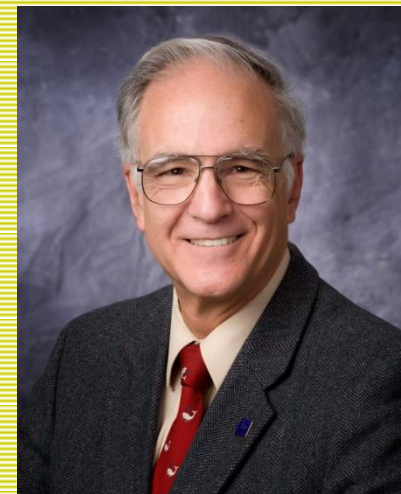


### **Pushing the Envelope of Cyclotron Technology: from Medical Applications to Neutrino Sources**

The Cyclotron, patented by E.O. Lawrence in 1934, has traditionally been a tool for nuclear physicists to study properties of nuclei. Even from the earliest days, however, applications of the beams from these machines in other fields have played an important role. Glenn Seaborg, in 1938 proposed the first use of an iodine isotope he discovered at the 27" cyclotron as a medical tracer, and in that same year Ernest's brother John Lawrence developed a program of treating tumors with neutrons from cyclotron beams hitting beryllium targets.

Today cyclotrons are in widespread use: for radioisotope production, for cancer therapy with proton beams, and for increasingly-diversified programs in nuclear and particle physics research.

This talk will cover the range of applications, and the evolution of machines optimized for each, and will explore new developments, from compact superconducting machines tailored for medical uses, up to and including a new project for development of very high-current cyclotrons as compact, cost-effective neutrino sources.



**Jose Alonso, MIT**

TUESDAY, April 16, 2013 : 2:30 PM, Mansion House, Nevis Labs / Reception to follow