

## PHYSICS COLLOQUIUM

**Eberhard Fetz**

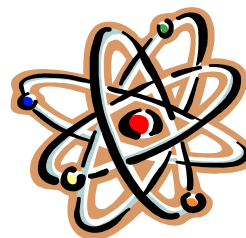
**UW Physiology and Biophysics**

“Towards Principles of Neural Computation in the Brain”

**Monday, March 10, 2008**

4:00 PM, Ronald Geballe Auditorium, Rm. A-102

# Seminars



***March 10-14, 2008***

Abstract: Discovering the operating principles of the brain represents a significant challenge. The unique complexity of the brain would seem to put it beyond the purview of simple physical analysis, but this may reflect the complexity of an autonomous non-linear parallel distributed processing system, not the absence of underlying principles of neural computation. While neural interactions can be described by "equations of motion", these fail to capture the essential information processing functions that mediate behavior. The properties of biological and artificial neural networks provide a rich basis for pursuing the mechanisms of neural computation. The cerebral cortex has functional subdivisions, each composed of similar columns of neurons that encode sensory and motor representations, leading to models of hierarchical processing of such representations. The parallel distributed processing of information in neural networks has interesting resemblance to holographic mechanisms. A promising candidate for the essential computation performed by cortical columns involves combining bottom-up and top-down information flow to implement memory-based prediction. This predictive coding operation could be performed by cortical columns at all functional levels, from sensory areas through association and motor areas. These topics will be reviewed toward initiating further discussion of possible principles underlying brain function.

**Tuesday, March 11**

**Particle Theory Seminar**

2:30 PM, Rm. C-421, PAT

Martin Savage, UW Nuclear

TBA

**Thursday, March 13**

**Physics Final Exam**

10:00 AM, Rm. C-520, PAT

Conor Buechler, UW Physics

“Thin film perpendicular magnets under partial saturation, experimental and theoretical investigations”

**Physics General Exam**

3:00 PM, Rm. C-520, PAT

Matthew Luzum, UW Physics

**Astronomy Colloquium**

4:00 PM, Rm. A-102, PAA

Neil Evans, University of Texas

“Star Formation: From Cores to Disks”