

Seminar on

# Modern Optics and Spectroscopy

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## **Spectroscopic and Computational Insights into the Biosynthesis and Reactivity of Adenosylcobalamin**

March 16, 2004  
12:00 – 1:00 p.m.

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### Abstract

The  $B_{12}$  cofactor adenosylcobalamin (coenzyme  $B_{12}$ ; the biologically active form of vitamin  $B_{12}$ ) has long fascinated chemists with its unparalleled structural complexity and unusual reactivity in biological systems, involving homolytic cleavage of the organometallic Co–C bond to produce  $Co^{2+}$ -cobalamin and an adenosyl radical. We utilize a combined spectroscopic/computational methodology to explore two fundamentally different, though complementary, aspects of  $B_{12}$  research; namely, the mechanism of biological Co–C bond *formation* in the adenosylcobalamin biosynthesis and the factors by which  $B_{12}$ -dependent enzymes accelerate the rate of homolytic Co–C bond *cleavage* by  $\sim$ 12 orders of magnitude without significantly enhancing undesired Co–C bond heterolysis.

Grier Room, MIT Bldg 34-401  
Refreshments will be served