

# 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<sub>12</sub> cofactor adenosylcobalamin (coenzyme B<sub>12</sub>; the biologically active form of vitamin B<sub>12</sub>) 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<sup>2+</sup>-cobalamin and an adenosyl radical. We utilize a combined spectroscopic/computational methodology to explore two fundamentally different, though complementary, aspects of B<sub>12</sub> research; namely, the mechanism of biological Co–C bond *formation* in the adenosylcobalamin biosynthesis and the factors by which B<sub>12</sub>-dependent enzymes accelerate the rate of homolytic Co–C bond *cleavage* by ~12 orders of magnitude without significantly enhancing undesired Co–C bond heterolysis.

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