

PHYSICAL MATHEMATICS SEMINAR

Microbial Burst Accompanying Earth's Greatest Extinction

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ABSTRACT:

Roughly 252 million years ago, the end-Permian extinction resulted in the greatest loss of life in the fossil record. The cause remains mysterious, but decades of research indicate that a strong perturbation of the global carbon cycle occurs at the extinction's peak. This talk addresses three aspects of this disruption. First, we show that geochemical signals indicate super-exponential growth of the marine inorganic carbon reservoir, coincident with the extinction and consistent with the expansion of a new microbial metabolic pathway. Second, we show that the efficient pathway via which members of the microbial genus *Methanosarcina* convert acetate to methane emerged at a time statistically indistinguishable from the extinction. Finally, we show that nickel concentrations in South China sediments increased sharply at the extinction, probably as a consequence of massive Siberian volcanism, enabling a methanogenic expansion by removal of nickel limitation. Collectively, these results are consistent with the instigation of Earth's greatest mass extinction by a specific microbial innovation.

TUESDAY, APRIL 29, 2014

2:30 PM

Building E17, Room 136

*Reception following in Building E17, Room 401A
(Math Dept. Common Room)*

<http://math.mit.edu/pms/>



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