Compressed Modes for Differential Equations

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This talk is on the use of ideas from information science in differential equations and physics. The focus is on variational principles and differential equations whose solutions are sparse; i.e. they have compact support. Analytic results will be presented on the size of the support and the completeness of these "compressed modes. Applications of compressed modes as Wannier modes for density functional theory and for signal fragmentation in radio transmission will be described.