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Abstract for an Invited Paper
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Physics and Sustainable Buildings

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Buildings account for roughly 40% of energy use and large fractions of water, materials and other dimensions of the national and global sustainability challenge. Physics imposes limits and creates opportunities for reducing resource demands and impacts while maintaining high performance. Using measured energy flows in instrumented buildings as a guide, this talk will highlight key physics aspects of the critical thermal, optical, fluid and electrical processes used in the current generation of high-performing buildings such as the Packard Foundation's and Bullitt Foundation's new "net zero" office buildings. Topics will include heat engines and heat exchangers, infra-red radiation, reflection and absorption spectra, and solar geometry.