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A Green Field Fourth Generation Light Source[1]

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The success of energy recovering linac technology has opened up new opportunities for the development of light sources to satisfy grand challenges in fundamental physics and materials research. A number of laboratories around the world have proposed extensions or upgrades to existing 2^{nd} or 3^{rd} generation light source facilities to take advantage of the higher brightness and short pulse lengths that 4^{th} generation facilities could offer. Ideas range from multiple synchronized coherent sources in the THz to UV range to Compton X-ray sources, synchrotron emission, and on to achievement of multi-particle coherence in amplifiers or even oscillators at short wavelengths. Such proposals are exciting and begin to show the range of performance that such systems can provide. In this talk I will examine the possibilities for light source development unconstrained by existing physical layouts i.e., on a "green field" site. I will then address a set of photonic goals to be achieved and the technological path of development desirable to achieve the full benefits of this next generation of user facilities. In particular, there are specific technical achievements and engineering developments with great leverage on the cost and performance of future machines. I will point toward a development path to set the stage for optimization of technical performance and cost/benefit of this system.