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QBOLT - Directed Energy System Concepts for Asteroid Threat Mitigation

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Asteroids and other extraterrestrial impactor threats to Earth and other planets occur naturally in our solar system. Larger, more massive bodies including cometary fragments in high energy trajectories will pierce through the Earth's atmosphere and cause cataclysmic destruction if they are not stopped well enough in advance. Modern Directed Energy Systems are an emerging feasible concept for mitigating the threat of Near-Earth Objects (NEOs). Directed Energy Systems are versatile, scalable, reusable architectures that focus intense coherent beams of energy on a target's surface through the use of phased array lasers. The energy is typically used for the purpose of ablating the surface of the target, or generating substantial ablative thrust to alter the trajectory of the bolide to a new innocuous path. Technologies are fast maturing that allow the integration, test and commissioning of such directed energy systems for use at astronomical distances. This concept architecture study explored innovative strategies for directed energy system application to potentially hazardous asteroid threat. QBOLT is a modulated directed energy system concept that proposes resonance excitation induced fragmentation of certain types of monolithic asteroids during the terminal phase of Earth approach.

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