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High Gradients in Dielectric Wakefield Accelerators

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Significant advancements in Dielectric Wakefield Accelerators (DWA) have been made since the first experiments 30 years ago. For example, the accelerating gradients observed have improved beyond the GV/m level at frequencies in the terahertz regime. Such strong fields generate a change in the dielectric field, similar to a metallization, that have implications for the operation of DWA as high-gradient accelerating structures. In addition to increases in gradient, the techniques used to fabricate DWA have improved leading to evolutions in the geometries of DWA, e.g. photonic confinement structures. This talk covers the details of this metallization-like process in dielectrics, its effects on running DWA at high gradients and how DWA based on exotic geometries impact the role of DWA as future accelerators.

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