Soni-Shape-Laser - Autogenous laser welding of aluminium battery cases, via contactless ultrasonic and free-form beam shaping.

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This presentation will introduce the project Soni-Shape-Laser, funded by the Innovate UK Smart Grant scheme, for assisting the laser welding of high-grade aluminiums, like Al6082 and other materials, as often required in battery manufacturing. During the presentation we will show the recent advances in integrating contactless high-frequency ultrasound and free-form beam shaping, allowing to replace state-of-the-art wire-fed laser welding with a fully autogenous and non-contact (remote) laser welding process. The proposed technology has the potential to control and modify the weld profile and the microstructure during solidification by conditioning the material response to the heat input of the laser via the beam shaping, and the mechanical excitation of the high-frequency ultrasonic vibration. We will demonstrate the Soni-Shape-Laser technology while welding Al6082 aluminium alloys - known for high hot crack sensitivity - for hermetically sealed joining of battery casings.