**Link:** [https://solar-power-tech.com/e-posters/psc\_eposter\_10/](https://solar-power-tech.com/e-posters/psc_eposter_07/)

**Abstract**

Perovskite Solar Cells (PSCs) are an emergent photovoltaic technology hindered by the susceptibility to humidity, oxygen and temperature [1]. Laser-Assisted glass sealing is a proven method for hermetically encapsulate the devices at low temperature [2]–[8]. In this process a laser source locally heats glass frit that bond two glass substrates. This process requires a precise homogenous compressive force and may require heating of the substrates to avoid thermal shock [8].

A thermomechanical model was developed to simulate a quasi-simultaneous laser sealing using Ansys Mechanical 2021. The simulated sealing conditions were room temperature, 50°C and 120°C with and without local pre-heating up to 50°C and 120°C. The numerical simulations showed that the maximum power required would be 67 W. These results are corroborated by previously published results [4], [7], [8].

The use of double laser assisted glass sealing may allow a durable hermetically encapsulation of temperature sensible devices as well as increasing the active areas up to 31%.

This method allowed to establish the requirements of a now commercially available Laser-Assisted Glass Sealing machine. The machine requires a pneumatic system to apply the homogenous force, one or two laser sources with respective galvanometric system, a heating system, and a chamber to create an inert atmosphere. The developed tools and the designed machine allow to take PSC development to a next level allowing to test long-term stability of highly efficient PV cells under inert atmosphere. These methods are also scalable and are a solution to the stability problems that concern the development of PSC at a large industrial scale.