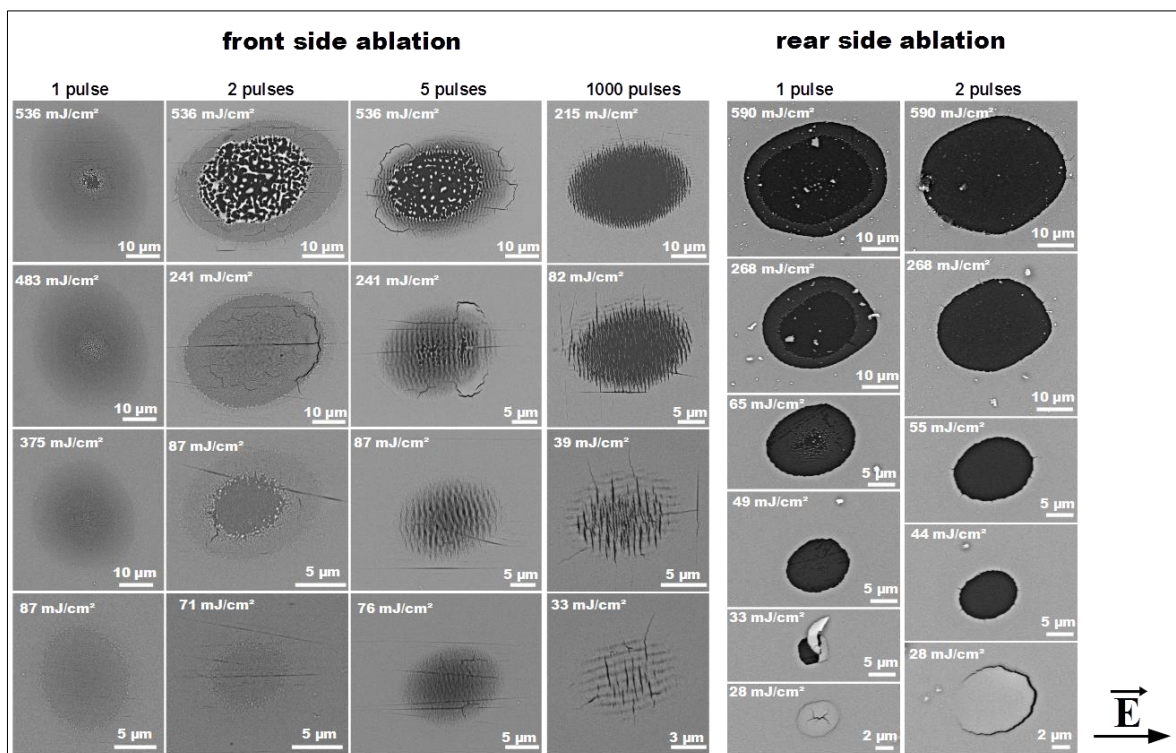


# COMPARISON BETWEEN FRONT AND REAR SIDE ABLATION OF NICR THIN FILMS ON TRANSPARENT SUBSTRATE USING FEMTOSECOND LASER RADIATION

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By processing thin films on transparent substrates two processing strategies can be applied which reveal different material removal processes. On the one hand the direct ablation of the thin film by irradiation from the film side and on the other hand by irradiation from the transparent substrate side, where the ablation occurs in an enclosed space at the substrate film interface. Therefore, the selective ablation of Nickel-Chromium-alloy films on glass substrate in comparison of front and rear side irradiation was investigated using femtosecond laser pulses. As a result, different irradiation morphologies were observed, dependent from the processing strategy and irradiation parameters. For front side irradiation a higher pulse number was necessary to fully ablate the film and the edge of the ablation was covered with melt residuum and undesirable structures, reducing the processing quality. Rear side ablation had the advantages of negligibly small heat affected zone and high machining precision, however, due to the ablation process cracks appeared at the edge of the ablation area. The processing form the substrate side revealed much better structuring results compared to film side ablation.



SEM images of ablation morphologies by front side ablation (left) and rear side ablation (right) at different pulse numbers and fluences