

METAL HIGH-REFLECTIVE MIRRORS FOR SPACE APPLICATIONS

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The volume of information necessary to transmit on Earth, in space, and between satellites and ground stations is increasing. Satellites are planned to be connected to the global secured quantum network on low-Earth orbits, to be used for quantum communication at higher distances from our planet. Such applications require optical components like metallic mirrors for signal preparation and transfer. In recent study [1], we report a systematic investigation on the silver-aluminium (Ag-Al) mixed mirrors designed for space missions. We show the Ag-Al mixed coatings preparation process and investigate their properties for various Al concentrations up to 15%. It was found that optimize Al admixing leads to the formation of smooth mirrors with high reflectance (measured >90% vis-IR range). Mirrors were tested by low-energy proton irradiation at doses typical for interplanetary missions. Furthermore, we have coated an additive manufactured complex shaped mirror [2]. The performance under high-power laser irradiation was numerically studied.

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[1] A. Belosludtsev, et. al., Adv. Space Res. submitted (2026),

[2] I. Bitinaitis, et. al. Opt, Mater., 169, 117570 (2026).