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von

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Lasers in Heritage Science:
Reinigung und Analyse von Malschichten bei Kunstobjekten

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Lasers in Heritage Science: Reinigung und Analyse von Malschichten bei Kunstobjekten

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Preservation of cultural heritage artefacts involves increasingly laser techniques for e.g. cleaning and also diagnostics (Fig. 1) [1, 2]. Particulate removal from fibrous, polymer [3-6] or painted substrates [7] has been studied systematically.

The treatment of organic materials such as paper is characterized by the limitation of photochemical and photothermal destruction. This is minimized when visible laser wavelengths are chosen such as the second harmonic (532 nm) of a Nd:YAG lasers [8-10].

Ultraviolet laser radiation, on the other hand, provides minimized light penetration depth and can serve as a quasi ultra-precise non-contact scalpel [11-13]. Yellowing is a side effect of laser treatments [6, 14]. Paper cleaning studies showed that yellowing could be minimized choosing 532 nm.

Fundamental investigations combining e.g. laser pulse interactions with atomic force measurements lead to thermomechanical models [15-18].

Stratigraphy on the other hand is an indispensable technique in the preservation praxis. A laser-induced breakdown spectroscopy stratigraphy is been developed allowing depth profiling down to single micrometer ranges (Fig. 2) [19, 20].

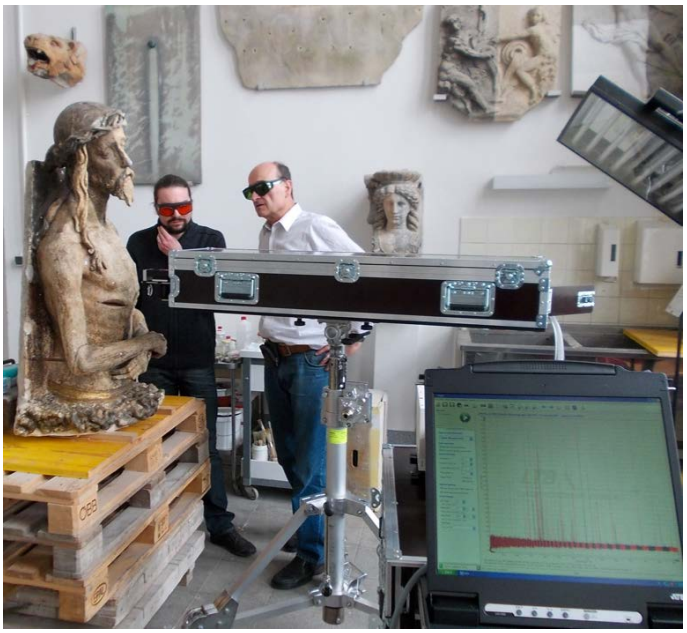

Fig. 1: Lasers in Heritage Science: Cleaning and Stratigraphy (U. Pacher and W. Kautek, at the Bundesdenkmalamt, Wien).

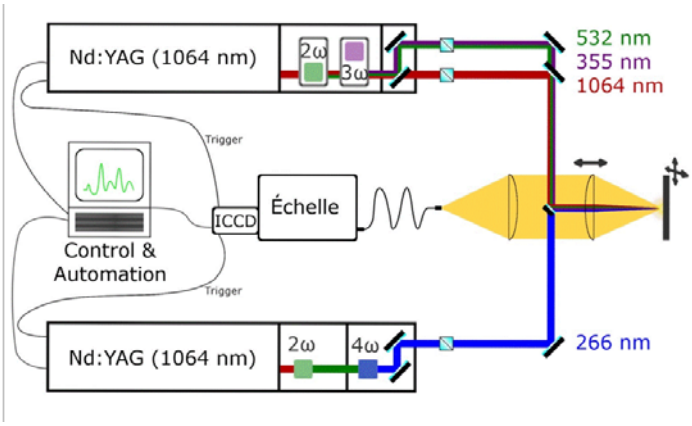

Fig. 2: Stratigraphy by multi-wavelength Laser-Induced Breakdown Spectroscopy (LIBS).

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