



Non invasive treatment of works of art. Applications of *MMW* radiations for disinfestations

Bruno Bisceglia (1), Roberto De Leo (2), Svetlana von Gratowski (3), Viatcheslav Meriakri (3), and Anna Pia Pastore (2)

(1) University of Salerno, Department of Information Engineering and Electrical Engineering, Italy (bbisceglia@unisa.it), (2) Università Politecnica delle Marche, Dipartimento di Elettromagnetismo e Bioingegneria - Via Breccie Bianche – Ancona – Italy, (3) Kotel'nikov Institute of Radioengineering and Electronics Russian Academy of Sciences, Fryazino Branch, Vvedenski sq.1, Fryazino Moscow reg.141190, Russia

The non invasive *MMW* treatment is not a recent application but it is still a surprising system that promises fascinating applications.

Some suitable results will be shown, describing the procedure and the methodology.

Lab experiments were carried out using a stirred rooms (dimensions of about $2 \times 2 \times 3$ m). The rooms are fed by a 6 KW magnetron working at 2.45 GHz. Stirring permits to obtain a nearly uniform distribution of density of power in the treatment area.

In order to choose the right amount of power so to avoid an increase of temperature that may be dangerous, an accurate and efficient simulation procedure has been realized.

Environmental parameters, first of all humidity, may damage culture heritage objects and give rise to various pests and other micro-organisms. Non-invasive monitoring of these damaging factors, as well as disinfestation and drying with the help of electromagnetic waves are preferred means since they keep an object untouched after treatment.

A lot of biological forms don't survive over a certain temperature, called *lethal temperature* which, for most xylophages is about 53-55 °C, while for moulds and funguses is between 65 and 70 °C.

The disinfesting system was successfully applied in an important restoration intervention, the Saint Leone Magno Statue: the *MW* disinfestations is easy, and totally efficient in a very short time. The *MW* exposure is realized in short time with no risks for environment and the treatment parameters are fully monitored.