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A Micro-Tomographic Insight into the Coating Systems of Historical Bowed String Instruments

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Abstract: Musical instruments are tools for playing music, but for some of them—made by the most important historical violin makers—the myths hide the physical artwork. Ancient violin-making Masters developed peculiar construction methods and defined aesthetic canons that are still recognizable in their musical instruments. Recently, the focus of scientific investigations has been set on the characterization of materials and methods used by the ancient violin makers by means of several scientific approaches. In this work, the merits of synchrotron radiation micro-computed tomography and optical coherence tomography (OCT) for the investigation of complex coatings systems on historical bowed string musical instruments are discussed. Five large fragments removed during past restorations from instruments produced by Jacobus Stainer, Gasparo da Salò, Giovanni Paolo Maggini, and Lorenzo Guadagnini have been considered for a non-invasive insight by tomographic techniques and the results are discussed considering previous micro-invasive investigations. The tomographic approach allows to highlight the micro-morphology of the coating systems and offers preliminary information on the methods that were employed by the ancient Masters to treat the wood and finish the musical instrument.

Keywords: varnish; musical instruments; tomography; synchrotron radiation micro-computed tomography; micro-CT; optical coherence tomography; OCT