



## **The Liverpool Microwave Palaeointensity System**

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The motivation for the group at Liverpool in the 1990s (led by John Shaw and Derek Walton) to start experimenting with using microwaves to demagnetise and remagnetise palaeomagnetic samples, rather than heating using conventional ovens, was to reduce laboratory induced alteration in absolute palaeointensity experiments. As with other methods, the non-ideal effects of grain size and naturally altered remanence must still be addressed. From humble beginnings using a domestic microwave oven the current 4th generation microwave system (MWS) has developed in to an integrated combined 14 GHz microwave resonant cavity and SQUID magnetometer system. The MWS is designed to investigate one 5 mm diameter sample at a time with microwave exposure (the equivalent of a heating step in conventional experiments) ranging from a few seconds up to around a minute. Each experiment (protocol, checks, direction and strength of applied field, number of steps etc) can be tailored to the behaviour of each individual sample. There have been many published studies demonstrating the equivalence of conventional thermal (Thellier) and microwave techniques using both artificial and natural remanence and also that the microwave method can indeed reduce laboratory induced alteration. Here an overview of the present MWS including a discussion of the physical processes occurring will be given. Examples of current projects (both archaeological and geological) utilising the method will also be described. Finally, future developments and applications of the method will be discussed.