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## **Ultrasonic Array Imaging of Defects in Polymer Pipes**

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High-density polyethylene (HDPE) pipes are increasingly being used in cooling water systems in nuclear power stations in the UK. Because HDPE does not corrode and does not biologically foul, it is favored over conventional materials such as cast iron. However, manufacturing defects sometimes form in HDPE pipe joints. The accurate and reliable detection of such defects currently poses multiple inspection and imaging challenges such as very high material damping, and heterogeneous and anisotropic acoustic properties. We therefore present an advanced technique for locating and sizing potential manufacturing defects in these joints. Our proposed imaging technique features multiple optimizations for HDPE that can be applied in general to media such as polymers. These yield improvements that we demonstrate via comparison with a generic implementation of an imaging process known as the total focusing method (TFM) that is of the same joint profile.