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## Reducing background/noise in stretched wire alignment technique measurements

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The stretched-wire alignment technique is one method of magnet alignment for linear induction accelerators. The applications of the Stretched-Wire Alignment Technique (SWAT) have been implemented for aligning magnets/solenoids on the Scorpius linear induction accelerator which will be sited at the Nevada National Security Site and the Flash X-Ray (FXR) linear induction accelerator at Lawrence Livermore National Laboratory's Contained Firing Facility.

This article describes both systematic (repeatable) and random sources of background/noise as well as practical ways to either eliminate or mitigate them to acceptable levels. Systematic sources include reflections from wire ends, rapid sag due to ohmic heating of the wire, magnetic materials, and shot rate. Random sources include air currents, vibration of nearby equipment, mechanical stability of test equipment, and the instruments used to measure the wire motion. Mitigations include curve fitting and adaptive noise signal cancellation, and mechanical damping. Finite Element Analysis (FEA) was used to interpret results.

### Footnotes

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North America

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