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Rotor vibration measurement is a key part of both the development and condition monitoring of rotating machinery. Measurement of the vibration transmitted from the rotor into a non-rotating component is the most common arrangement but in many situations the ideal rotor vibration measurement would be one taken directly from the rotating component. The non-contact nature of laser vibrometers are ...

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The photo detector is connected to the storage oscilloscope and microvoltmeter to display and measure the output. Next an electric motor, whose rotor vibrations are to be detected and measured, is so introduced in the experimental set up that its rotor cuts the laser beam partially. Download : Download full-size im-

age; Fig. 1. Block diagram of experimental set-up.

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Based on the principles of laser Doppler velocimetry, the laser torsional vibrometer (LTV) was developed for non-contact measurement of torsional oscillation of rotating shafts, offering significant advantages over conventional techniques.

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This important equation can be used to derive an expression for the velocity measured, U_m , in a scanning Laser Vibrometer measurement on a rotating target of flexible cross-section undergoing six degree-of-freedom vibration, θ :
$$U_m = \sin 2\theta [x \dot{r}(P_0) + x \dot{f}(P)] - \cos 2\theta [S_x \sin 2\theta S_y [y \dot{r}(P_0) + y \dot{f}(P)] + \cos 2\theta S_x \cos 2\theta S_y [z \dot{r}(P_0) + z \dot{f}(P)]]$$
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