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**Acoustic vector sensors and vector/tensor processing in ocean
acoustics research**

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Several passive sensor systems that simultaneously measure acoustic pressure and the three components of acoustic particle motion have been designed and deployed in seagoing experiments by the Marine Physical Lab over the past two decades. Descriptions of these sensor systems and results from applying various signal/array processing methods with these data are presented in this talk. Although vector sensors do not provide any additional information on the sound field than that obtained by a suitable number of properly placed hydrophones, they do provide estimates of the sound field's directional properties from a very compact package. Applications where available space is severely limited include autonomous underwater vehicles (AUV). Recent results from acoustic vector sensors installed in a flying wing underwater glider and inside a prop-driven AUV to quietly measure sounds in the ocean illustrate the benefits, and drawbacks, of the use of vector sensors on autonomous platforms. The extension of the signal/array processing approaches to tensor sensors indicates the promise of additional gain, if the sensor design challenges can be overcome. [Work supported by the Office of Naval Research].