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## Abstract

How to achieve high data rate coherent underwater acoustic (UWA) communications is a challenging topic due to several unique properties of UWA environments, especially in shallow water acoustic environments. Time reversal, or phase conjugation in the frequency domain, is a process engages in achieving high data rate and reliable high frequency coherent communications in time-varying UWA environments, while reducing the system complexity significantly compared with traditional methods, such as using large arrays of sensors, or redundantly transmitting at different time. Therefore, time-reversal technique has been approved to be a promising technique in future UWA communications and networks. In his paper, we will present an overview of the application of the time-reversal process to acoustic communications. The content includes basic concept and mechanism of time-reversal in UWA communications, passive and active time-reversal UWA communications, application challenges of the time-reversal technique in UWA communications and networks.

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Computer Science

### Index Terms

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### Keywords

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