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A Stochastic Semiclassical Time Front Prediction for Ocean Acoustics[1] KATHERINE HEGEWISCH, STEVEN TOMSOVIC, Department of Physics and Astronomy, Washington State University, Pullman — Low frequency sound propagates in the ocean within a wave guide formed by the confining effects of temperature, salinity and pressure on the sound speed. This wave guide enables long range propagation upwards of 3000 km. Within the wave guide, sound scatters due to range dependent sound speed oscillations from internal waves and gives rise to wave chaos, where most of the classical rays are chaotic. This chaos poses challenges to ray predictions of the range and frequency dependence of properties of the 'time fronts', the acoustic arrivals in depth and time. Though semiclassical theory works well for strongly chaotic systemss, finding the necessary eigenrays for long ranges is unrealistic here. Instead, we utilize semiclassical and perturbation theories ONLY for short ranges and extend these results to long ranges using a previously introduced diffusive theory. We verify the diffusive assumptions and demonstrate the analytic results for these theories for short ranges before arriving at a stochastic prediction.

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Katherine Hegewisch
Washington State University, Pullman

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