Transverse drag of slow light in a moving atomic vapor

Y. Solomons, C. Banerjee, S. Smartsev, J. Friedman, D. Eger, O. Firstenberg, and N. Davidson

Weizmann institute of science, Israel

The Fresnel-Fizeau effect of transverse drag, in which the trajectory of a light beam changes due to the transverse motion of the optical medium, is usually extremely small and hard to detect. We observe transverse drag in a moving hot-vapor cell, utilizing slow light due to electromagnetically induced transparency (EIT) [1]. The drag effect is dramatically enhanced by the ratio between the light speed in vacuum and the group velocity under EIT conditions. We study the contribution of the thermal atomic motion and identify the regime where its effect on the transverse drag is negligible. Finally, we will present recent results of a negative transverse drag in a medium with a negative group velocity.

[1] Y. Solomons, C. Banerjee, S. Smartsev, J. Friedman, D. Eger, O. Firstenberg, and N. Davidson, "Transverse drag of slow light in moving atomic vapor", Opt. Lett. 45, 3431 (2020).