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How does the Warm Breeze affect the heliospheric backscatter glow of interstellar neutral helium?

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Based on direct sampling observations of interstellar neutral helium (ISN He) by IBEX, we have discovered a new population of ISN He, dubbed the Warm Breeze (WB), and identified it as the secondary population of ISN He, created in the outer heliosheath. The WB flow is twice slower and hotter by half than the primary ISN He, and it flows from a direction different by $\sim$5° in longitude and $\sim$6° in latitude. Its density is $\sim$5% of that of ISN He. ISN He had been extensively studied in the past by analysis of the backscatter glow, but the WB was not considered in these analyses because its existence had been unknown. However, the ISN He speed and temperature derived from analyses of the heliospheric helium glow tended to be systematically biased towards slower speeds or higher temperatures with respect to those obtained from direct-sampling experiments. We calculate the expected intensity of the backscatter glow due to the ISN He and WB using the best-fit parameters recently obtained from IBEX direct-sampling observations and compare its distribution in the sky with that expected only from the primary ISN gas. In the modeling, we use a time-dependent hot model of Maxwell-Boltzmann distribution of ISN gas and carefully account for the bulk velocities and temperatures of the direct and indirect beams of the two populations, as well as for details of the ionization rates. We discuss differences between intensities of the backscatter glow expected from different regions in the sky, obtained for the models including and excluding the WB and point out that the absence of the WB component in the modeling may have biased the parameters of the primary population of ISN He derived from the helium backscatter glow and lead to underestimating the Mach number of the flow, due to a slower bulk speed or higher temperature.