 **Key points:** This paper investigates the possibility of planet formation in the habitable zone (HZ) of Alpha Centauri B, a binary star system. It focuses on the early stages of planet formation, particularly the accretion of kilometer-sized planetesimals, which are sensitive to the gravitational effects of the binary companion.

 **Important formulas or discoveries:** The study doesn't highlight specific formulas but uses numerical simulations to model the dynamics of planetesimals in the binary system. It considers the combined effects of the companion star's perturbations and gas drag on planetesimal accretion.

 **Limitations:** The study acknowledges that its simulations are simplified and do not include all possible mechanisms that could influence planet formation in the HZ. It also notes the uncertainty in the initial conditions of the binary system, which could have evolved over time.

 **Summary:** The study concludes that planetesimal accretion is marginally possible in the innermost part of the HZ around Alpha Centauri B, but the conditions are not favorable for planet formation in the rest of the HZ due to high collision velocities. It suggests that a wider initial binary separation or a lower eccentricity in the past could have created a more favorable environment for planet formation.