

# BRANCHING BROWNIAN MOTION WITH CATALYTIC BRANCHING AT THE ORIGIN

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**Abstract:** We consider a branching Brownian motion in which random number splitting takes place only when particles are at the origin at a rate  $\beta > 0$  on the local time scale. We first establish spine decomposition for the case  $p_0 > 0$ . Then using this tool, we obtain results regarding the asymptotic behaviour of the number of particles above  $\lambda t$  at time  $t$ , for  $\lambda > 0$ . As a corollary, we establish the almost sure asymptotic speed of the rightmost particle. We also prove a strong law of large numbers for this catalytic branching Brownian motion and we only need a  $L \log L$  condition.