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**Time Dependence of Angular Alignment in Heavy Ion Collisions**[1]

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This study provides theoretical input regarding the time dependency of the angular alignment, $\alpha$, an angle used to assess the amount of rotation of a projectile-like fragment (PLF*) after separating from a target nucleus. A set of Constrained Molecular Dynamics (CoMD) simulations of $^{70}$Zn+$^{70}$Zn nuclear collisions with collision energies of 35 and 45 MeV/nucleon was used to study this correlation. An algorithm is proposed which searches through CoMD events and identifies the excited PLF* after it separates from the target and determines its lifetime, $\Delta t$. It also determines the alignment angle $\alpha$, of the PLF*. The dynamic yield is extracted, and its evolution with PLF* lifetime is studied. The correlation of the average alignment angle in the dynamic contribution, $\langle\alpha\rangle_{dyn}$, is approximately linearly correlated with PLF* lifetime with $d\langle\alpha\rangle_{dyn}/d\Delta t = 2.0 \pm 0.2$ rad/zs for both collision energies studied, consistent with values utilized in prior experiment

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