Non-Poissonian run-and-turn motions FRANCOIS DETCHEV-
ERRY, University of Lyon, CNRS — Swimming bacteria exhibit a variety of motion
patterns (run-and-tumble, run-reverse, run-reverse-flick), in which persistent runs
are punctuated by sudden turning events. What are the properties of such random
motions? If a complete answer has been given when the turning events follow a
Poisson process, it has remained elusive outside this particular case. We present a
generic framework for such non-Poissonian run-and-turn random motions. We ob-
tain the generating function of moments by building on the framework of continuous
time random walks and using non-commutative calculus. The approach is applied
to a bimodal model of persistent motion that is directly applicable to swimming
patterns and cell motility.

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