

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

The role of fluctuations and interactions in pedestrian dynamics¹

ALESSANDRO CORBETTA, JASPER MEEUSEN, Eindhoven Univ of Tech, ROBERTO BENZI, University of Rome Tor Vergata, CHUNG-MIN LEE, CSULB, FEDERICO TOSCHI, Eindhoven Univ of Tech — Understanding quantitatively the statistical behaviour of pedestrians walking in crowds is a major scientific challenge of paramount societal relevance. Walking humans exhibit a rich (stochastic) dynamics whose small and large deviations are driven, among others, by own will as well as by environmental conditions. Via 24/7 automatic pedestrian tracking from multiple overhead Microsoft Kinect depth sensors, we collected large ensembles of pedestrian trajectories (in the order of tens of millions) in different real-life scenarios. These scenarios include both narrow corridors and large urban hallways, enabling us to cover and compare a wide spectrum of typical pedestrian dynamics. We investigate the pedestrian motion measuring the PDFs, e.g. those of position, velocity and acceleration, and at unprecedentedly high statistical resolution. We consider the dependence of PDFs on flow conditions, focusing on diluted dynamics and pair-wise interactions (“collisions”) for mutual avoidance. By means of Langevin-like models we provide models for the measured data, inclusive typical fluctuations and rare events.

¹This work is part of the JSTP research programme “Vision driven visitor behaviour analysis and crowd management” with project number 341-10-001, which is financed by the Netherlands Organisation for Scientific Research (NWO).

Alessandro Corbetta
Eindhoven Univ of Tech

Date submitted: 11 Nov 2016

Electronic form version 1.4