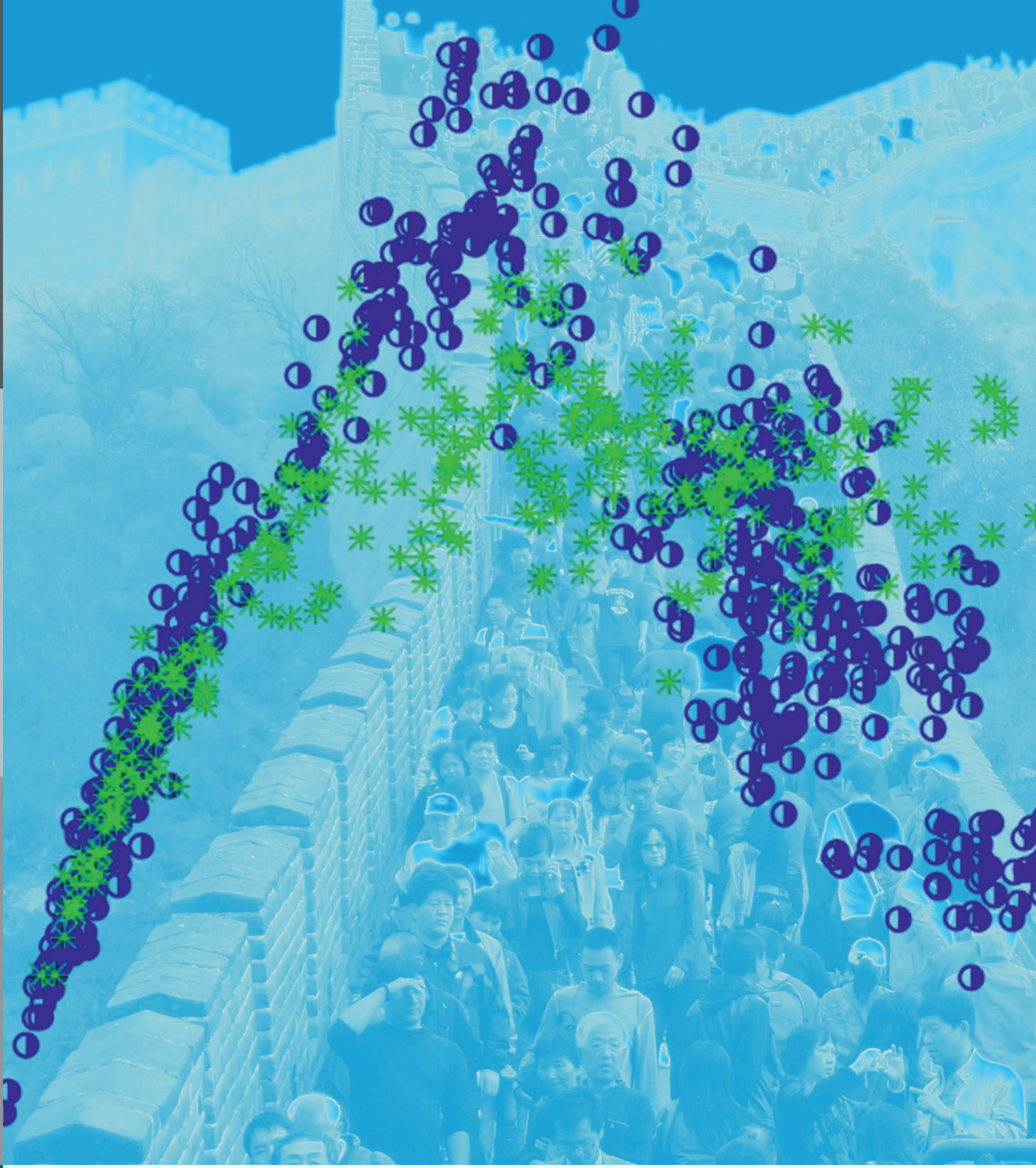

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Pedestrian fundamental diagrams: Comparative analysis of experiments in different geometries

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Schriften des Forschungszentrums Jülich

IAS Series Volume 14

ISSN 1868-8489 ISBN 978-3-89336-825-9

Contents

This dissertation mainly analyzes the fundamental diagram describing the relation between crowd density, velocity and flow based on series of well-controlled laboratory experiments. The commonly used fundamental diagrams in handbooks are reviewed especially for uni- and bidirectional pedestrian streams. The differences and influence of them on facility designs are compared.

Four different measurement methods are taken to calculate the crowd density, velocity and specific flow. Their influences on the fundamental diagram are tested with the data obtained from the experiment of unidirectional flow.

Pedestrian experiments of uni-, bidirectional and merging flow are analyzed based on the Voronoi method for its high precision. The topographical information for density, velocity and specific flow, from which the boundary effect are observed, are extracted. The specific flow concept is applicable to all types of flows in the density ranges observed in the experiments. Surprisingly, no difference is found for the fundamental diagrams of bidirectional flow with different modes of ordering.

A sharp distinction is observed between the fundamental diagrams of uni- and bidirectional flow. For the merging flow in T-junction, the fundamental diagrams measured in front of and behind the merging show also significant differences.

IAS Series
Volume 14
ISBN 978-3-89336-825-9

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