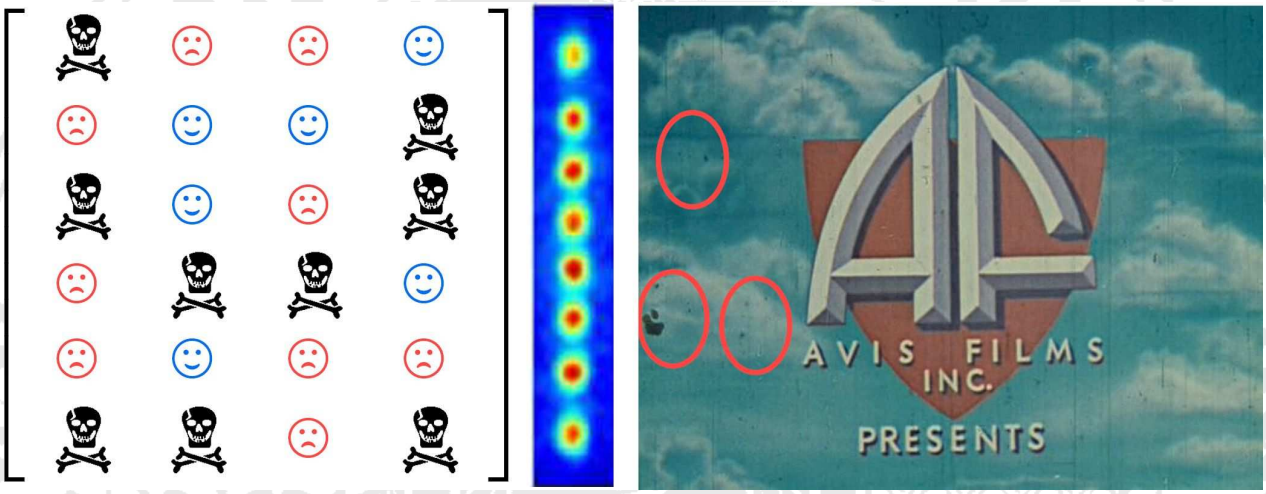
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg
Physikalisches Institut

PHYSIKALISCHES KOLLOQUIUM

ANTRITTSVORLESUNG

AM 7. JANUAR 2013 UM 17 UHR C.T.

IM GROßEN HÖRSAAL



PHYSICS AND BIG DATA: FROM SINGLE PIXEL CAMERAS TO QUANTUM STATE TOMOGRAPHY

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Every time the release button of a digital camera is pressed, several megabytes of raw data are recorded. But the size of a typical jpeg output file is only 10% of that. What a waste! Can't we design a process which records only the relevant 10% of the data to begin with? The recently developed theory of "compressed sensing" achieves this trick for certain signals. I will introduce the ideas and math behind these achievements. Some methods we originally introduced for a theory of "quantum compressed sensing" have since found purely classical applications - notably for the analysis of new algorithms for such diverse tasks as face recognition, despeckling of movie frames, and prediction of user preferences in online shops from incomplete and corrupted data.