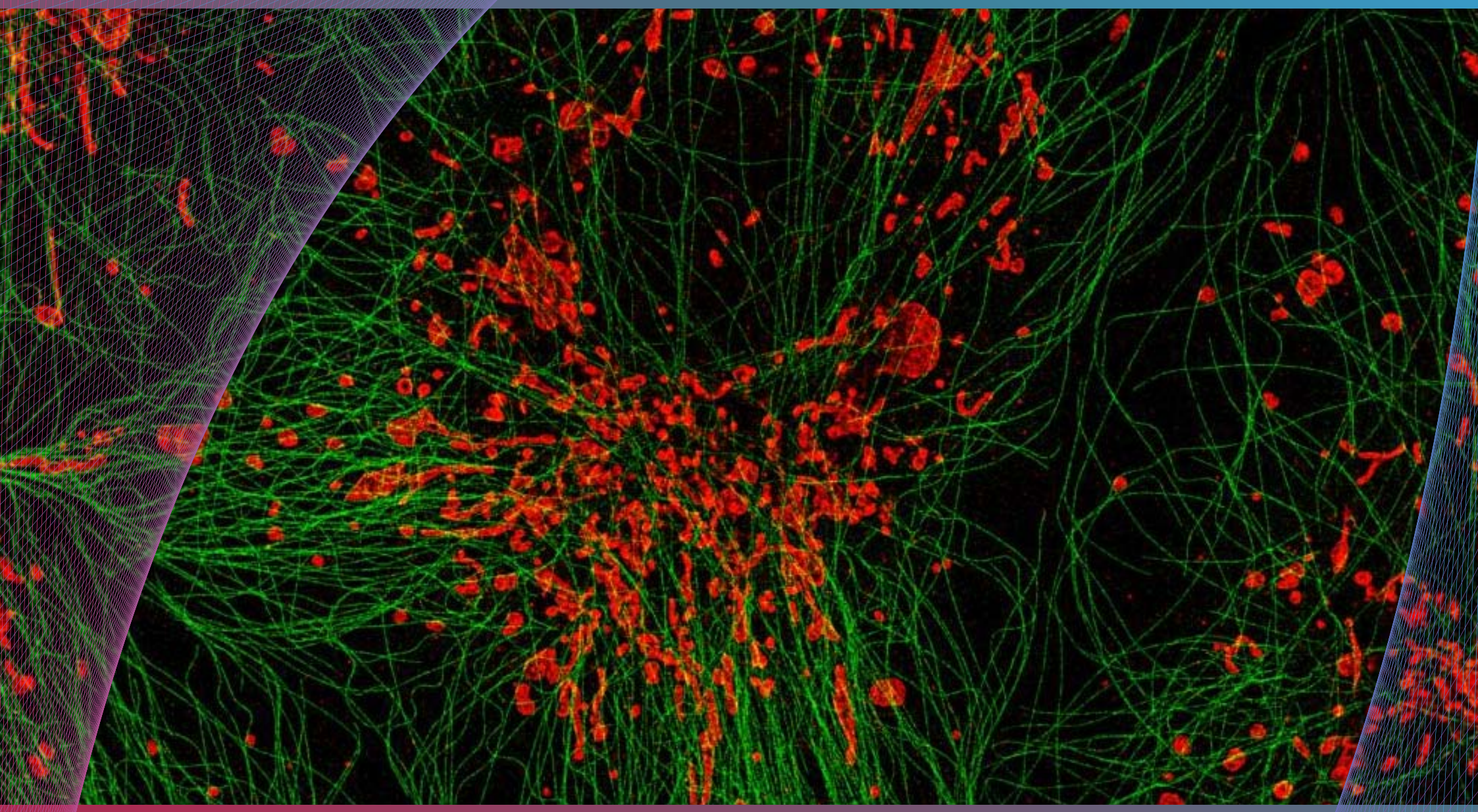
PHYSICS COLLOQUIA 2021/2022



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BIOPHYSICAL MYSTERIES AND INSIGHTS INTO ORGANELLE STRUCTURE AND DYNAMICS

11 2022

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Nearly all eukaryotic cells contain mitochondria, which are highly mobile and can change their shape, divide, or fuse with each other.
We use super-resolution microscopy and fluorescent sensors of physiological and biophysical states
to understand how mitochondrial division and transcription are organized.
Where do mitochondria divide, and how is the location of division determined?
We find that division occurs spatially in a non-random, regulated manner, giving rise to mitochondria with different fates.
How are mitochondrial transcripts organized? Mitochondrial RNA granules are highly enriched in mitochondrial RNA,
and we find that they behave as liquid condensates, although they are remarkably stable.
What are the molecular and physical requirements for division to occur?
We discovered that many constrictions relax without dividing,
in a process that depends strongly on membrane tension.

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