

Quantum Mechanics and Cancer Biology

The Beyond Center for Fundamental Concepts in Science

Arizona State University

October 24 - 27, 2010

Agenda

Sunday Oct 24

6:00 – 7:30 pm Informal welcome reception, Tempe

Monday Oct 25

Session 1: Conceptual overview

9:15 – 9:30 am Paul Davies

Brief welcome address, outline of the subject and aims of the meeting

9:30 – 10:15 am Paul Davies

“Schrödinger’s legacy”

10:15 – 11:00 am Vlatko Vedral

“Does life exploit the quantum edge?”

11:00 – 11:15 am *Tea/coffee break*

11:15 – 12:00 pm Don Coffey

“Cancer and physics: the need for new thinking”

12:00 – 12:30 pm Discussion

12:30 – 1:30 pm *Lunch*

Session 2: Delayed decoherence in large molecules

1:30 – 2:15 pm Libby Heaney

“Needle in a haystack: possible avenues for finding quantum effects in cancer”

2:15 – 3:00 pm Elisabeth Rieper

“DNA entanglement and error correction”

3:00 – 3:30 pm Discussion

3:30 – 3:45 pm *Tea/coffee break*

3:45 – 4:30 pm Marlan Scully

“Noise induced coherence and quantum searching in biosystems”

4:30 – 5:30 pm Discussion

Tuesday Oct 26

Session 3: Entanglement and quantum epigenetics

9:00 – 9:45 am Gerard Milburn

“Entanglement as a biological resource”

9:45 – 10:30 am Hans Briegel

“Quantum information and entanglement in biological systems”

10:30 – 11:00 am Discussion

11:00 – 11:15 am *Tea/coffee break*

11:15 – 12:00 pm Jeff Tollaksen/Yakir Aharonov

“Weak values and biological post-selection”

12:00 – 12:30 pm Discussion

12:30 – 1:30 pm *Lunch*

Session 4: Microtubules and ion channels

1:30 – 2:15 pm Jack Tuszynski

“Quantum effects in biological nanostructures as a window on cancer”

2:15 – 3:00 pm Stuart Hameroff

“Quantum fluctuations in mitosis as a trigger for cancer”

3:00 – 3:30 pm Discussion

3:30 – 3:45 pm *Tea/coffee break*

3:45 – 4:30 pm Alipasha Vaziri

“Quantum coherence in ion channels”

4:30 – 5:30 pm Discussion

Wednesday October 27

Session 5: Fluctuations and mutations

9:00 – 9:45 am Johnjoe McFadden

“Stochastic fluctuations: a bolt-hole for quantum mechanics”

9:45 – 10:30 am Sandu Popescu

“Dynamic entanglement in oscillating molecules and potential biological implications”

10:30– 11:00 am Discussion

11:00 – 11:10 am *Tea/coffee break*

11:15 – 12.30 am TBA

12:30 – 1:30 pm *Lunch*

Session 5: Experimental possibilities

1:30 – 2:15 pm Stuart Lindsay

“Meanwhile, back in the lab...”

2:15 – 3:00 pm Anirban Bandyopadhyay

“Experimental detection of quantum effects in mitotic spindles”

3:00 – 3:30 pm Discussion

3:30 – 3:45 pm *Tea/coffee break*

3:45 – 5:00 pm Open discussion

5:00 pm *Workshop ends*

Public lecture

Location: Neeb Hall, ASU Tempe Campus

7:00 pm Don Coffey

“Controlling cancer: progress, challenges and paradigm shifts”
