

THEORY: TG1 www.physics.umd.edu/cmtc

Only CM theory (although a lot of AMO theory is done by Das Sarma and Galitski: parts of 4 MURI/ 2 DARPA)

Ted Einstein (PhD 1973, at UMD since 1975)

Sankar Das Sarma (PhD 1979, at UMD since 1980)

Ted Kirkpatrick (PhD 1981, at UMD since 1983): never here

Victor Yakovenko (PhD 1987, at UMD since 1992)

Victor Galitski (PhD 2003, at UMD since 2007)

Michael Levin (PhD 2007, at UMD since 2011)

Jay Sau (PhD 2009, at UMD since 2013): not here yet

Currently, 16 postdocs and 11 PhD students (the largest CM theory group in the USA in terms of activity, NOT faculty); *most popular theory topic for PhD students– the group can accept only 1 out of 4!*

Total annual funding~ \$2.2 million per year
(Das Sarma~ \$1.5 million; Galitski~ \$0.4 million)

- **Strong connection to JQI (Das Sarma, Galitski, Sau, Yakovenko JQI fellows---all JQI theory postdoctoral fellows so far, 8, chose this group to do their research)**
- **Strong connection to JQI-PFC (Das Sarma is in the PFC council ; several PFC-supported theory postdocs work with us– Sun, Sau,...)**
- **Condensed Matter Theory Center (established in 2002 as retention for Das Sarma; as of 2012 July includes all CMT faculty; \$150K/yr.)**
- **Strong connection to local AMO/CM experimental research (lots of joint publications, lots of joint grants: Graphene, Polar Molecules, Atomtronics, OLE, Topological Insulators, Qubits, MRSEC, PFC...)**
- **Strong collaboration within the group (Das Sarma has joint publications with all except for Levin; joint theory grants; student/postdoc sharing)**
- **Strong outside collaboration (DARPA QuEST, MURI, IARPA,.....)**
- **Students/postdocs get top jobs (Li/Cheng/Biddle; Sun/Sau/Barnett/Powell....)**

RESEARCH (quantum CM theory and collective many-body AMO theory; very broad scope)

- *>22,000 citations since 2008 (more than any other group!)*
- *>275 publications since 2008 (more than any other group)*
- *17 postdocs in faculty jobs since 2008 (more than ???)*
- *8 PhDs produced since 2008*
- *Just below the top-5 in ‘cachet’– we lose postdocs and students to Harvard, Stanford, Berkeley, MIT, Princeton, but not to anybody else (~Urbana/Caltech/UCSB)*
- *What we need:*
 - (1) Adequate space in PSC (at least 1000 sq ft of office space for the JQI theory part of TG1)*
 - (2) Two more faculty hiring in the next 5 years (2015, 2018)*
 - (3) Increase of CMTC state group funding to 250K per year*

RESEARCH (topological phases of matter; Majorana fermions; graphene; quantum computation; spin qubits; quantum phase transitions; superconductivity; low-dimensional systems; optical lattices; spin-orbit coupling; ultracold bosons and fermions; surface physics; metal-insulator transition and localization, spintronics.....)

- *There is no specific theme: we do everything that is interesting (18 different grants support our research including unconventional sources such as INTEL, Sandia National Labs, Microsoft!)*
- *6th most cited RMP since 2008 ('topological quantum computation'); 2nd most cited RMP since 2011 ('graphene'); 2nd most cited RMP since 2004 ('spintronics')*
- *1st most cited (2D Majorana) and 3rd most cited (1D Majorana) theory PRLs since 2010; 20th most cited PRL since 2007 (graphene); 7th most cited PRB since 2007 (graphene); many more among top-50 most cited articles in PRL/PRA/PRB during 2007-2012*
- *Strong interaction inside/outside the group creates 'high impact'*