Computational Frontier
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Theory Frontier

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Computational Frontier Kick-Off Meeting
August 10-11, 2020

Aim of Talk

✦ As liaison between the two frontiers, I would like to

- explain the organization of the Theory Frontier to this audience
- highlight some of the areas of overlap
- detail some known interactions
- encourage future interactions

Theory Frontier: structure

Nathaniel Craig
UCSB

Csaba Csaki
Cornell

Aida El-Khadra
UIUC

Topical Group		Topical Group co-Conveners			
TF01	String theory, quantum gravity, black holes	Daniel Harlow	Shamit Kachru	Juan Maldacena	
TF02	Effective field theory techniques	Patrick Draper	Ira Rothstein		
TF03	CFT and formal QFT	David Poland	Leonardo Rastelli		
TF04	Scattering amplitudes	Zvi Bern	Jaroslav Trnka		
TF05	Lattice gauge theory	Zohreh Davoudi	Taku Izubuchi	Ethan Neil	
TF06	Theory techniques for precision physics	Radja Boughezal	Zoltan Ligeti		
TF07	Collider phenomenology	Fabio Maltoni	Shufang Su	Jesse Thaler	
TF08	BSM model building	Patrick Fox	Hitoshi Murayama		
TF09	Astro-particle physics and cosmology	Dan Green	Joshua Ruderman	Ben Safdi	Jessie Shelton
TF10	Quantum information science	Simon Catterall	Roni Harnik	Veronika Hubeny	
TF11	Theory of Neutrino Physics	André de Gouvêa	Irina Mocioiu	Saori Pastore	Louis Strigari

Future Interactions

- CompF2: has been seeking theorists to participate in relevant LOIs. Extensively covered in parallel session.
- CompF3: Machine learning is of interest to both experimentalists and theorists. Expect and need more interaction here.
- CompF6: should continue the strong interactions with Quantum Information Science in the Theory Frontier
- CompF7: I suspect there is more interest among theorists in long-term preservation of data and code than is currently manifest. I hope some theorists will reach out to this group and consider submitting an LOI.
- TF07: specifically mentions CompF3, CompF6

Future Interactions II

- I again emphasize that theory, algorithmic, and experimental/hardware development in quantum computing go hand in hand. Especially we think that close collaborations and communication between theorists and hardware and algorithm developers in QC is a necessity in achieving technologies that are customized to the needs of field-theory/LQCD community. …encourage more coordination … to come up with a comprehensive roadmap of the field in this area. *Zohreh Davoudi (TF5-Lattice Gauge Theory)*