Towards high precision in multi-channel reactions of composite nuclei

ESNT project – 29 June – 3 July • CEA Saclay, DPhN, Orme des Merisiers, b. 703, room 135

Mon · 29 Jun	**Vision and experiments**			
09:00–10:00	E. Hiyama, M. Schäfer, J. Kirscher	Summary of the vision and the placement of the contributions therein	an organiser	In consensus, select problems and solution designs in order to: taking specific steps to significantly increase precision in predictions for fusion-relevant observables.
10:30–11:30	G. Hupin	Ab initio predictions for thermonuclear fusion		
11:30–12:30	A. Sanetullayev	Investigating halo nuclei with IRIS		
		12:30–14:30 • lunch		
14:30–15:30	*Review and discussion on the morning's talks. Here, we must involve Valerie as an experimentalist.* *We must also be realistic what type of facility is likely to operate.*		V.Lapoux	Ideal would be to agree upon a set of benchmark observables which serve both fundamental science and fusion application.
15:30–16:30	*Identify the observables of most "potential": rel. large exp./th. uncertainty, yet fusion-relevant.*			
Tue · 30 Jun	**(Nuclear) theory – foundations and implementation details**			
09:00–10:00	H. W. Grießhammer	General features & bugs & problems of the EFT approach to the nuclear interaction	S. Ogawa	Operator structure of the (improved-action) contact interaction; degrees of freedom and Coulomb.
10:30–11:30	M. Schäfer	Structure of the (improved-action) contact interaction up to N^3LO		
11:30–12:30	M. Rojik	Contact-EFT potentials for different degrees of freedom and Coulomb		
		12:30–14:30 • lunch		
14:30–15:30	*morning review (ECCE: this will be a crucial session since most of us have no experience* *in calibrating interactions, and we must have trust in our choice)*		A. Deltuva	HWG could enrich this discussion with his summary and exemplification of perturbation theory.
15:30–16:30	*Practicality of the operator structures and hierarchies for the community's codes.* *for instance, how do we extract **perturbative** corrections, shall we work in coordinate or momentum representation?*			
Wed · 1 Jul	**Approximation schemes and numerical implementations (I)**			
09:00–10:00	E. Hiyama	Gaussian expansion method and its perspective.	A. Sanetullayev	NNQS responses, CDCC, and $^{12}C+{}^{12}C$ fusion
10:30–11:30	S. Ogawa	Recent developments and applications of the continuum-discretized coupled-channels method		
11:30–12:30	W. Horiuchi	Glauber-theory calculations using many-body wave functions		
		12:30–14:30 • lunch		
14:30–15:30	N. Barnea	Nuclear responses with neural-network quantum states.	J. Carbonell	Nir's talk should be the precursor to Wednesday's presentations, otherwise we would have put Taniguchi-san's talk in this slot.
15:30–16:30	*morning "vs." afternoon review, or,* *traditional/existing vs. novel/new approaches and implementations.*			
Thu · 2 Jul	**The next generation's view**			
09:00–09:45	I. Horin^{+14m}	Constraining neutron capture on unstable nuclei from β-delayed decay data using R-Matrix theory	W. Horiuchi	Machine-learning and neural-network methods across structure and reactions
09:45–10:30	L. Avraham	Bosonic Helium Clusters within Neural Quantum States		
11:00–11:45	A. Sarkar	Ab-initio scattering using Nuclear lattice EFT		
11:45–12:30	Tian Jiaqi	Microscopic description of hypernuclear spectroscopy via control neural networks		
		12:30–14:00 • lunch		
14:00–15:00	A. Deltuva	Momentum-space description of few-body reactions	Lazauskas	We will find time to have coffee inbetween the sessions.
15:00–15:30	D. Likandrovas	Application of machine learning to nuclear reactions		
16:00–16:45	Pierre-Yves Duerinck	DD reactions with Faddeev-Yakubovsky techniques		
Fri · 3 Jul	**Approximation schemes and numerical implementations (II) + week-2 planning**			
09:00–10:00	R. Lazauskas	Application of the Faddeev–Yakubovsky equation formalism	P-Y. Duerinck	Faddeev–Yakubovsky, momentum-space, Glauber and NCSM/RGM approaches compared
10:30–11:30	H. W. Grießhammer	A guide to perturbative corrections for a variety of dynamical equations		
11:30–12:30	Y. Taniguchi	Channel-coupling effects in low-energy $^{12}C+{}^{12}C$ fusion		
		12:30–14:30 • lunch		
14:30–15:30	Plenum	Review of the week's presentations and an open discussion on the pertinence to the goal of the project.		
15:30–16:30		Collection and draft of the second week's implementation plan.		