

Experimental and theoretical status of and perspectives for XYZ states

Opening & welcome

Frank Nerling
HFHF, GSI Darmstadt

ExtreMe Matter Institute EMMI

EMMI Workshop

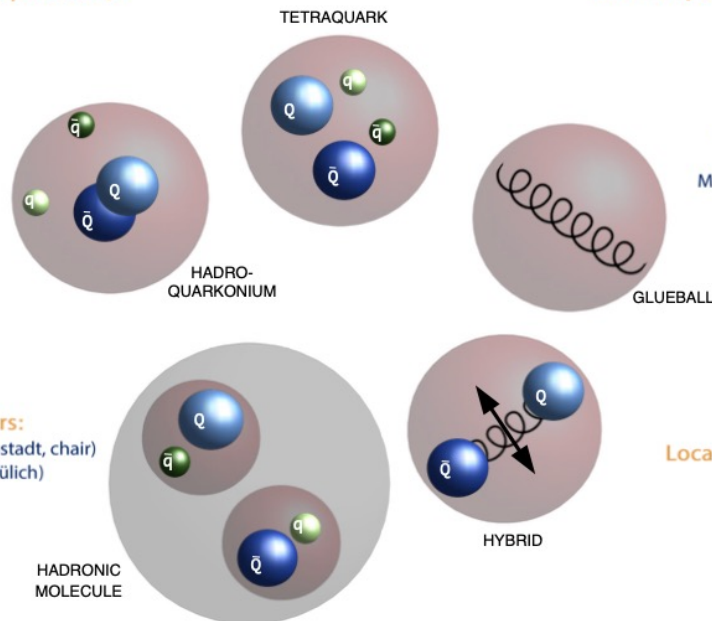
Experimental and Theoretical Status of and Perspectives for XYZ States

In memory of Mikhail Voloshin († March 20, 2020)

GSI Darmstadt, Germany, April 12-15, 2021

Invited Speakers (Experiment):

Peter Braun-Munzinger
Sean Dobbs
Simon Eidelmann
Alexey Guskov
Zhiqing Liu
Roman Mizuk
Sebastian Neubert
Marco Pappagallo
Cheng-Ping Shen
Chengzeng Yuan



Invited Speakers (Theory):

Eric Braaten
Nora Brambilla
Feng-Kun Guo
Luciano Maiani
Ulf-G. Meißner
Alessandro Pilloni
Sinead Ryan
Marc Vanderhaegen

Scientific Organisers:

Frank Nerling (GSI Darmstadt, chair)
Christoph Hanhart (FZ Jülich)

Logistics and Local Organisation:

Udo Kurilla
Anja Meergans
Frank Nerling

The workshop focusses on the current status and future perspectives of both theory and experiment in the field of exotic hadrons in the heavy quarkonium mass range. While a majority of the community agrees that the XYZ states have a non- $\bar{q}q$ nature, the internal structure of these states is not yet understood. Key players in the field are Belle (II) (Japan), BESIII (China) and LHCb (CERN). In the future, the gluon-rich process of $p\bar{p}$ annihilation promises new insights.

Online registration:

<https://indico.gsi.de/e/XYZ-states-2021>

Information:

www.gsi.de/emmi/workshops

More about EMMI:

www.gsi.de/emmi

Mikhail Voloshin
1953 – 2020



[College of Science and Engineering – University of Minnesota]

Experimental and theoretical status of and perspectives for XYZ states				Public - Europe/Berlin F. Nerling			
from Monday, April 12, 2021 (9:00 AM) to Thursday, April 15, 2021 (6:00 PM) online				: Sessions / : Talks : Breaks			
Apr 12, 2021				Apr 13, 2021			
AM	9:00 AM	xyz (until 10:25 AM) (online)		9:00 AM	xyz (until 10:20 AM) (online)		
	9:00 AM	Opening - Frank Nerling (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)) (online)		9:00 AM	Belle(II) results in the charm sector - Chengping Shen (Fudan University) (online)		
	9:05 AM	BESIII results on vector Y states - Changzheng Yuan (IHEP Beijing) (online)		9:40 AM	Belle(II) XYZ results in the B sector - Kirill Chilikin (Lebedev Physical Institute of the Russian Academy of Sciences) (online)		
	9:45 AM	BESIII results on X, Z states - Zhiqing Liu (Shandong University) (online)		10:20 AM	---	Coffeebreak ---	
	10:25 AM	---	Coffeebreak ---	10:40 AM	xyz (until 12:05 PM) (online)		
	10:45 AM	xyz (until 12:00 PM) (online)		10:40 AM	Coupled-channel interpretation of the LHCb double-J/psi spectrum - Alexey Nefediev (Lebedev Physics Institute) (online)		
	10:45 AM	Dissecting XYZ-states with functional methods - Christian Fischer (JLU Giessen) (online)	Fischer_extotichadrons.pdf	11:05 AM	X0(2900) in the molecular picture - Qian Wang (South China Normal University) (online)		
	11:10 AM	Test of the nature of $\Psi_{\text{cs}}(4459)^{\pm}$ as a hadronic molecule in the $\$X_i b \Lambda^0 \to J/\psi \Lambda^0 K^+ S^- \$ decay - Li-Sheng Geng (Beihang University) (online)$		11:30 AM	Production of 1^{++} states in e+e- collision - Yuping Guo (Fudan University) (online)		
	11:35 AM	X(3872) in the hybrid model of charmonium and hadronic molecule - Yasuhiro Yamaguchi (Japan Atomic Energy Agency) (online)		11:55 AM	ExtreMe Matter Institute EMMI - Carlo Ewerz (EMMI/GSI) (online)		
PM	12:00 PM	---	Lunchbreak ---	12:05 PM	---	Lunchbreak ---	
	2:00 PM	xyz (until 3:20 PM) (online)		2:00 PM	xyz (until 3:20 PM) (online)		
	2:00 PM	Effective field theories for regular quarkonia and exotics - Nora Brambilla (TUM) (online)		2:00 PM	Production of X(3872) - Alessandro Pilloni (INFN Roma) (online)		
	2:40 PM	Hadronic Molecules - Ulf-G. Meißner (Univ. Bonn/FZ Jülich) (online)		2:40 PM	Production of X(3872) - Eric Braaten (Ohio State University) (online)		
	3:20 PM	---	Coffeebreak ---	3:20 PM	---	Coffeebreak ---	
	3:40 PM	xyz (until 4:55 PM) (online)		3:40 PM	xyz (until 5:10 PM) (online)		
	3:40 PM	Nonrelativistic effective field theories for exotic heavy hadrons - Jaume Tarrús (IFAE) (online)		3:40 PM	Loosely bound states in relativistic nuclear collisions at the LHC - Peter Braun-Munzinger (EMMI/GSI) (online)		
	4:05 PM	Heavy fourquarks and dibaryon states - Nilmani Mathur (Tata Institute of Fundamental Research) (online)		4:20 PM	X(3872) and Ddbar* interactions in a nuclear medium - Miguel Albaladejo Serrano (JLAB) (online)		
	4:30 PM	On history of the bottomonium-like states Z_b discovery (In Memoriam Misha Voloshin) - Alex Bondar (Budker Institute, Novosibirsk) (online)		4:45 PM	The properties and production of fully-heavy tetraquarks in a strongly interacting medium - Jiaying Zhao (Tsinghua University) (online)		
Apr 14, 2021				Apr 15, 2021			
	9:00 AM	xyz (until 10:20 AM) (online)		9:00 AM	xyz (until 10:20 AM) (online)		
	9:00 AM	LHCb results on charmonia - Marco Pappagallo (Università e INFN Bari) (online)		9:00 AM	Triangle singularities and new ideas about the X(3872) - Feng-Kun Guo (Institute of Theoretical Physics, CAS) (online)		
	9:40 AM	LHCb results on exotic charmonia - Sebastian Neubert (HISKP Uni Bonn) (online)		9:40 AM	Importance of meson-meson and of diquark-antidiquark creation operators for a b-bar b-bar u d tetraquark - Marc Wagner (Johann Wolfgang Goethe-Universität Frankfurt am Main) (online)		
	10:20 AM	---	Coffeebreak ---	10:20 AM	---	Coffeebreak ---	
	10:40 AM	xyz (until 11:55 AM) (online)		10:40 AM	xyz (until 11:55 AM) (online)		
	10:40 AM	Observation of the Zcs(3985) state at BESIII - Ying-Chao Xu (UCAS) (online)		10:40 AM	Bottomonium resonances in the Born-Oppenheimer approximation using static potentials from lattice QCD - Lasse Mueller (Goethe University Frankfurt) (online)		
	11:05 AM	Zcs exotics in B -> J/psi phi / K decays at LHCb - Zehua Xu (Peking University) (online)		11:05 AM	Long ranged part of static potential - Naeem Anwar (FZJ) (online)		
	11:30 AM	Vector states above open charm threshold - Zhiyong Wang (IHEP, CAS) (online)		11:30 AM	Hybrid static potentials at small quark-antiquark separations - Carolin Riehl (Goethe University Frankfurt) (online)		
	11:55 AM	---	Lunchbreak ---	11:55 AM	---	Lunchbreak ---	
	2:00 PM	xyz (until 3:20 PM) (online)		2:00 PM	xyz (until 3:30 PM) (online)		
	2:00 PM	Radiative a pionic transitions of Y(4320) and the new Z_sc(3982) - Luciano Maiani (Universita' di Roma La Sapienza) (online)		2:00 PM	Lattice QCD in the doubly heavy sector - Sinéad Ryan (Trinity College Dublin) (online)		
	2:40 PM	Inclusion of pi pi interactions in heavy meson decays - Igor Danilkin (JGU Mainz) (online)		2:40 PM	Heavy-Light Tetraquarks with Lattice QCD - Martin Pfaffner (Goethe Universität Frankfurt) (online)		
	3:20 PM	---	Coffeebreak ---	3:05 PM	COMPASS results on XYZ states - Alexey Guskov (Joint Institute for Nuclear Research) (online)		
	3:40 PM	xyz (until 4:55 PM) (online)		3:30 PM	---	Coffeebreak ---	
	3:40 PM	Insights on the Z_b(10610) and Z_b(10650) from the dipion decays - Vadim Baru (Ruhr University Bochum) (online)		3:50 PM	xyz (until 5:20 PM) (online)		
	4:05 PM	CMS results and prospects on XYZ states - Ruslan Christov (P.N.Lebedev Institute, Russian Academy of Sciences (LPI RAS)) (online)		3:50 PM	Precision Scan of the X(3872) at PANDA - Klaus Götzten (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)) (online)		
	4:30 PM	GlueX results - Sean Dobbs (Florida State University(FSU)) (online)		4:15 PM	Future relevant experiments - Simon Eidemann (Budker Institute, Novosibirsk and Lebedev Institute, Moscow) (online)		
				4:55 PM	Closing of the workshop - Christoph Hanhart (FZ Jülich) (online)		
				5:00 PM	Just a test for upload - Udo Kurila Test (GSI) (online)		

This workshop has been organised to

- Overview our exciting field of charmonium-like XYZ states, experimentally and theoretically
- Discuss the perspectives and opportunities in view of upcoming facilities and experiments



Let me wish us a very interesting workshop with lively discussions – **thank you very much for your participation!**