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<i>Natalia Mednikova, Georgy Belozarov, Viktor Pytchenko</i>	
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<i>Guangming Chen, Volodymyr Ierin, Oleksii Volovyk, Kostyantyn Shestopalov</i>	
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<i>David Cabailero, Filippo Agresti, Simona Barison, Stefano Rossi, Sergio Bobbo, Laura Fedele</i>	
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