

Summer school • IHÉS, 6-17 July 2015



# Moduli Problems

in

# Symplectic Geometry

$$GW_{g,k,A}^M(a_1, \dots, a_k; \beta) = \int_{\overline{\mathcal{M}}_{g,k}(A; J)} \text{ev}_1^* a_1 \smile \dots \smile \text{ev}_k^* a_k \smile \pi^* \text{PD}(\beta) \quad \text{index}(D_F) = n\chi(\Sigma) + \mu(E, F)$$

$$GW_{dL, 3d-1}^{\text{CP}^2}(c^2, \dots, c^2) =: N_d = \sum_k N_k N_\ell \left( k^2 \ell^2 \binom{3d-4}{3k-2} - k^3 \ell \binom{3d-4}{3k-1} \right) \quad \Phi(q_\gamma) = \sum_{\gamma', d} \frac{1}{k} n_{\gamma, \gamma', d} z^d q_{\gamma'}$$

$$a * b = \sum_{A \in K^{\text{eff}}} \sum_{\nu, \mu} GW_{A,3}^M(a, b, e_\nu) g^{\nu\mu} \quad \partial q_\gamma = \sum_{\gamma', d} \frac{n_{\gamma, \gamma', d}}{k_{\gamma'}} z^d q_{\gamma'} \quad \partial q_\gamma = \sum_{k! \prod_{i=1}^k} \frac{n_{\Gamma, I, d}}{k!} q_{\gamma_1}^{i_1} \dots q_{\gamma_k}^{i_k} z^d$$

$$\partial_{t_0} \Phi(q, t) = \frac{1}{2} \int_M a_t \smile a_t \quad \Phi(t) = \sum_{A, p} GW_{A,p}^M(a_t, \dots, a_t) e^A \quad n_{\Gamma, I, d} = \#(\mathcal{M}_0^d(\gamma; \gamma_1, \dots, \gamma_k) / \mathbb{R})$$

$$\partial_{t_i} \Phi(q, t) = q_i \partial_{q_i} \Phi(q, t) + \frac{1}{2} \int_M e_i \smile a_t \quad \text{TW}_{X \# Y}(\alpha) = \text{TW}_X^V(\alpha_X) * S_V * \text{TW}_Y^V(\alpha_Y) \quad \text{TW}_X = e^{\text{GW}_X}$$

$$GW(X) = \sum_{A \neq 0} \sum_{g \geq 0} e_{A,g}(X) \cdot GW_{A,g}^M(X) \quad g \in \mathbb{Z} \quad \mathfrak{h} \in \mathfrak{P} \quad \{\mathfrak{h}, \mathfrak{h}\} = 0 \quad \mathfrak{h} = \{\mathfrak{h}, g\}, \quad g \in \mathfrak{P}$$

$$\mathbf{H} \circ \mathbf{H} = 0 \quad d\mathbf{H} + \frac{1}{2}[\mathbf{H}, \mathbf{H}] = 0 \quad \partial_{t_j} \partial_{t_\nu} \Phi \cdot g^{\nu\mu} \cdot \partial_{t_\mu} \partial_{t_k} \partial_{t_\ell} \Phi \cdot g^{jk} \sum_{\nu, \mu} \partial_{t_j} \partial_{t_\nu} \Phi \cdot g^{\nu\mu} \cdot \partial_{t_\mu} \partial_{t_i} \partial_{t_\ell} \Phi$$

$$\mathbf{H} = \frac{1}{\hbar} \sum_{g=0}^{\infty} \mathbf{H}_g \hbar^g \quad \mathbf{H}_g = \sum_{d, r, s^\pm=0}^{\infty} \frac{1}{r! s^-! s^+!} \dots \partial_s u + J_t u - X_{H_t}(u) = 0$$

$$H_{*+n}^{S^1}(W, M) \xrightarrow{[\cdot]} \overline{\text{CH}}_*^{\text{lin}}(M) \quad H_{*+n}^{[S^1]}(W, M) \xrightarrow{[\cdot]} SH_*^{[S^1]}(W)$$

$$\sum_{A \neq 0} GW_{A,g} t^{2g-2} q^A = \sum_{A \neq 0} n_{A,h} \sum_{k=1}^{\infty} \frac{1}{k} \left( 2 \sin \frac{kt}{2} \right)^{2h-2} q^{kA}, \quad n_{A,h} = \#(\mathcal{M}_{g,r,s^\pm}^A(\theta_1^+, \dots, \theta_r; \alpha_1^-, \dots, \alpha_{s^-}^-, \alpha_1^+, \dots, \alpha_{s^+}^+) / \mathbb{R})$$

Application Deadline: **15 March 2015**  
 Information & Application: [www.ihes.fr](http://www.ihes.fr)

## Speakers

- Mohammed Abouzaid (Columbia, USA)
- Peter Albers (WWU Münster, Germany)
- Paul Biran (ETH Zürich, Switzerland)
- Frédéric Bourgeois (Université Paris-Sud, France)
- Daniel Cristofaro-Gardiner (Harvard, USA)
- Tobias Ekholm (Uppsala Universitet, Sweden)
- Yakov Eliashberg (Stanford, USA)
- Joel W. Fish (IAS & UMass Boston, USA)
- Helmut Hofer (IAS, USA)

- Michael Hutchings (UC Berkeley, USA)
- Dusa McDuff (Barnard College, Columbia, USA)
- Jo Nelson (IAS & Columbia, USA)
- Ivan Smith (Cambridge, UK)
- Jake Solomon (Hebrew University, Israel)
- Cliff Taubes (Harvard, USA) (to be confirmed)
- Claude Viterbo (ENS Paris, France)
- Katrin Wehrheim (UC Berkeley, USA)
- Chris Wendl (University College London, UK)

## Organizers

- chair:** Jo Nelson (IAS & Columbia, USA)
- Daniel Cristofaro-Gardiner (Harvard, USA)
- Joel W. Fish (IAS & UMass Boston, USA)

## Scientific Committee

- Helmut Hofer (IAS, USA)
- Michael Hutchings (UC Berkeley, USA)
- Dusa McDuff (Barnard College, Columbia, USA)