****Problem Set 1****

1. [Eigenvalues and eigenvectors of a general Hermitian 2 x 2 matrix](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0328d164beac470aad236bf512e0e387)
2. [Completeness](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/230ef2d947354062ba184f8b709a2b0b)

****Problem Set 2****

1. [Equivalent states](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a4b10c9f51904ce28cfee2efd20f37e8)
2. [More spin eigenstates](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac6a73a8c03a4d17913e09c028a6c90e)

****Problem Set 3****

1. [Quantum Key Distribution in the BB84 protocol](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0363ebe72afb480f85339332c2e84740)
2. [Eavesdropping](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e54c61b3f3304213b214be9466842d2e)

****Problem Set 4****

1. [Rabi Oscillations](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38e5f25900174f0fad3eac2867376f56)
2. [Probability and energy of bosons](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f71d84f5897042d2bc8c4be95f18dccc)

****Problem Set 5****

1. [Stern Gerlach](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e33494f3e95e4c68914d8d964680c45c)
2. [Exponentiation of Pauli Matrices](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e0b555fb94d946e5bfd0ec92b3ca5894)
3. [Working with Pauli identities](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/021edab17a704935b25ddc0dcbef6af7)
4. [Exponential disentangling](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a3881974d47e40569de7c5e445a056c9)
5. [Exponential disentangling for symplectic matrices](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cce124a1b2dd416e9eeb64e617e9d8fd)

****Problem Set 6****

1. [Commutator of momentum with an exponential](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/da4e130aefe041f88cc501abe0faae45)
2. [Braiding and exponential re-ordering](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/704906ab40c14f0e8e24f315ad164975)
3. [Hadamard for Pauli matrices](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8191171aa7bc44188d7fbd6be118457d)
4. [Gaussian wavepacket](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8d928e53f54b44d5825a708fa05f1638)
5. [The free particle](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7cba168195b6497082cd7a4e3e517553)

****Problem Set 7****

1. [Momentum states on a circle](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b3fb7783cde64d60ab33293cc6e3bd25)
2. [Position operator on a circle](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52818f14e224491cacad08e0804c9ae8)
3. [Lennard-Jones potential](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/597eb811572943e7b42acd811a3e3ba4)
4. [Operators and the simple harmonic oscillator](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ee7677c9c104432a4a73854347ac1ab)
5. [Uncertainty](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/28ddf98d60f844eeb1d5f413629ac998)

****Problem Set 8****

1. [Application of Baker-Campbell Hausdorff formula to the simple harmonic oscillator](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9f2411c3e683429bbaa8dd90c276773b)
2. [Wavefunction in momentum space](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9a9525963e87444e90862014530a9c69)
3. [Coherent states](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/04e9a268abf24ff78b170aa0bcb3c85e)
4. [Squeezed states](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/db8d47fd92144b12908ee018247914da)
5. [Simple harmonic oscillator in 3D and the Deuteron](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4e1085b8720a477980eccdf09f6f95fd)

****Problem Set 9****

1. [Angular momentum uncertainty and hidden variables for Bell experiments](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a3255e90e70c4406be2ef6ff903f6441)
2. [Molecular rotation spectroscopy](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/46941092d81547c8ab0947f2f46f1d34)
3. [Orthogonality of spherical harmonics](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c0523c942ea24e059a5e0bad7c0c817b)
4. [Normalization of eigenstates in the factorization method](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5cc8ac0d439a4f8c81bf9aa2e53828e6)
5. [The subsidiary condition and wavefunctions](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/bc5b758cd4924feebf43c4dde51b4bca)

****Problem Set 10****

1. [Factorization chain for a circle](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e0196061923d4778b9aa65e428ab2751)
2. [The subsidiary condition and wavefunctions](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6c14bee8514b699ccf07d771c9e1db)
3. [The tanh^2 potential](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f143e1dada7d455aa7cb3f672ba28f03)
4. [Separation of variables in 2D](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/760add9aba4b47a5833c51083158c0cc)
5. [Morse potential](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/85e50051038444dea1e05d7329d63842)

****Problem Set 11****

1. [Normalization factor of the isotropic simple harmonic oscillator](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9ce6a0d8c28242a1be6a08b6165b8b04)
2. [Using factorization to find the energies of the 2D simple harmonic oscillator and Coulomb problems](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6e633642da4bf58a34335ae5608884)
3. [Testing the validity of Coulomb's law](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b055c70af9924bffb6845925948f3c23)
4. [The virial theorem and the size of atoms](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d1684a0885094ef9b16a77bb5534a366)
5. [Kramers-Pasternack relation for positive powers](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f6719e7f9ebf44b29e3ae7e38ac43cf1)

****Problem Set 12****

1. [Kramers-Pasternack II](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52169bd428f64e6a8d46f7d5348eb971)
2. [Kramers-Pasternack for inverse moments 3,4,5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9947fdf023fb4d4e887ff07331a0720e)
3. [Uncertainty and Hydrogen](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3d6bc006317a4e4daa31d80106252220)
4. [Hydrogen in momentum space](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06a8d3da18164a81bf574a016b07a484)
5. [Hydrogen in momentum space II](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f33108f973064ecfaeed5dd55478aaba)

****Problem Set 13****

1. [Perturbation theory of the anharmonic simple harmonic oscillator](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/be6eb53ccf284913a29233411b130562)
2. [Muonic hydrogen](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ee581617c1fb49b696b7b1590a0c830f)
3. [Landau-Zener problem](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fed3ab2523004c889b4b397ed4c071bc)
4. [Particle in a 2D circular box](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4c14f2f0260545c6ae904c78f0951f7a)
5. [Time dependence of squeezed states](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec2eac49640c4b3aae9911a673de4630)

Abelian group [Mod 5, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ce123829238b4446b49bc7b3bc56ef55)

Angular momentum [Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369), [Mod 7, p12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6e338d7608c43b798ffdebe2aa022c6)

Angular momentum commutation relations [Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

Angular momentum eigenstates [Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

Angular momentum lowering operator [Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

Angular momentum raising operator [Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

Angular momentum, total squared [Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

Anharmonic oscillator [Mod 9, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/be6eb53ccf284913a29233411b130562)

Baker Campbell Hausdorff identity [Mod 6, p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5c6c47369be74e9ba158e1b1bff647ff)

BCH identity, Weyl form[Mod 6, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b7), [Mod 6, p36](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b7)

Balmer series [Mod 7, p44](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d97746bddc9749f3b4b11858be796fb7)

Beam splitter [Mod 4, p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/277641e7721a4c2b8abc18c7703eb22a)

Bell's experiment[Mod 2, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f9c3e9dcc5e243328ab49cfb893ec682)

Bell's inequality [Mod 7, p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/bba344e8d19648da91a9afb29e08ec95), [Mod 7, p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a3255e90e70c4406be2ef6ff903f6441)

Binomial coefficient [Mod 4, p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/184dbecb90a145b1b8f847989f360840)

Binomial theorem [Mod 4, p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/184dbecb90a145b1b8f847989f360840)

Bosons [Mod 4, p25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06d304136bba48f0b0765fd72c2d89e3), [Mod 4, p29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8cfa6aae6f774e8fb35234f481986a2d), [Mod 4, p33](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f71d84f5897042d2bc8c4be95f18dccc)

Boson states, counting [Mod 4, p 30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/df2aa2804a1347509a828846573a3413), [Mod 4, p32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4672799b1a554cf9a06a6412ade2db44)

Bound states [Mod 8, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5a64b4b26255462d921e46a952b03627), [Mod 8, p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f76c9e7d0f3d485184447b43f72ac00e), [Mod 8, p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/71c9530289324cca8fc097a845f08dc3), [Mod 8, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/446e2afb1bec4a3686fbfc6204f659c9), [Mod 8, p23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ebb91d7f4f543e5a7133609e2901793)

Braiding Identity [Mod 5, p28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/704906ab40c14f0e8e24f315ad164975)

Canonical commutation relation [Mod 5, p17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e7dfc01e6fdc4bf4b0cfaf072661bf91), [Mod 5, p18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3f370ed711114e13aaed1693f24c8534)

Change of basis[Mod 1, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7ce9fc0d0fa04abdac96c8f8ee598f0f)

Coherent state [Mod 6, p27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cf577109ce4643f89ea669652d74d05a), [Mod 6, p38](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/04e9a268abf24ff78b170aa0bcb3c85e), [Mod 9, p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ed6672655e240feae1fdac534fbd6ff)

Collapse theory [Mod 2, p34](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/764cf8e30601490b8d2537d7e3a69df9)

Commutator [Mod 2, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cd38009e419440f984eeaa34490671a8)

Commutator of powers of position and momentum [Mod 5, p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/98b68287f81245c6b8920a6509282342), [Mod 5, p27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/da4e130aefe041f88cc501abe0faae45)

Complementarity [Mod 2, p10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4fb128b5d7414c8f9f7cdb0724ac3c94)

Completeness [Mod 1, p27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/230ef2d947354062ba184f8b709a2b0b)

Complex numbers [Mod 3, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17a00a75aa7c45608cc407fef91d8991)

Compound probability amplitudes [Mod 4, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/df51351937a94849aebb9aa166df1bf1)

Copenhagen interpretation [Mod 7, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c2ebe0a360d04129b6c67eaf02ba437f)

Coulomb problem Mod 7, p43

Coulomb wavefunctions [Mod 7, p47](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/444daadf6bb34702ae50d52172a0e1bc), [Mod 7, p48](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2a8ff35d3f0e4d64b33d7fcaa5527cfa), [Mod 7, p49](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e6880cbee6b84020b6a2f69ce6f401cb)

Current loops [Mod 1, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1f22e32d9a7340c38fb9234e8f5d177f)

Cyclotron [Mod 9, p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/dced1ec9aab5423eb0d65526af418fad)

Dark count [Mod 4, p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fe53e674dbc74ac3a7e969ff294fc279)

DeBroglie wavelengths [Mod 5, p25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ba4ac300d9384361b10f1e0ef2ae1379)

Degeneracy [Mod 6, p40](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4e1085b8720a477980eccdf09f6f95fd)

Delayed choice [Mod 2, p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/57dfcf012acd4b8d83cc31c9dbf821b1), [Mod 2, p23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/79dd2211d6db426ca4ca5ac894d54889), [Mod p25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e15466db77c8415f8fe693313813e5fe)

Deuterium [Mod 7, p45](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cb413b2d4ee4484b9d44f755ebbecefc), [Mod 7, p46](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/07e03fee32a74c9e9ab559c6444d091d)

Deuteron [Mod 6, p34](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac78af60faf54e18bba8461846bd726e)

Diffraction

Diffraction, double slit [Mod 3, p16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f2bd17299e684a55ac9c3a2e3993cdc9), [Mod 3, p17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e1005141fda44fb8a92986979b0f7017)

Diffraction, single slit [Mod 3, p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6c9208c8532544b59672f7aa63259521), [Mod 3, p17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e1005141fda44fb8a92986979b0f7017)

Diffraction grating[Mod 3, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d8107e2772c546299a289d708c6c6d91)

Dirac notation [Mod 1, p18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0a51e3c1adbd4385a18a0fcffbc0170e), [Mod 1, p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f9a97a47f06b46699fb3a58aa12bac38), [Mod 1, p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/bc3a530ee71040de86f272f520b9acff), [Mod 1, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7ce9fc0d0fa04abdac96c8f8ee598f0f)

Double slit experiment [Mod 3, p13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92366face8ce4676bdcbd415240928bb), [Mod 3, p18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/419dec5ecf524cbd85e00a9feba10b92), [Mod 3, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f6cc8531943f473da0bbe39af85a678f)

Eigenvalue [Mod 1, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f37d9f9da9844f9da1c296851713e7e7), [Mod 1, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0328d164beac470aad236bf512e0e387)

Eigenvector [Mod 1, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f37d9f9da9844f9da1c296851713e7e7), [Mod 1, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0328d164beac470aad236bf512e0e387)

Electron momentum spectroscopy [Mod 7, p58](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/727fcbc7f0654f88873fe31ce7ac6170), [Mod 7, p59](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a10152556a22461e81566c7abea2b3f6), [Mod 7, p60](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6cda48e77cca4f7ebca05872adcfd1c7)

Entanglement [Mod 2, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0bfd7ca17fac48b28537ed9672fe7c41), [Mod 2, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b0b3a034d7264ab59899eb71700b80c2)

Einstein Podolsky Rosen experiment [Mod 7, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c2ebe0a360d04129b6c67eaf02ba437f)

EPR paradox [Mod 2, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0bfd7ca17fac48b28537ed9672fe7c41), [Mod 2, p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/57dfcf012acd4b8d83cc31c9dbf821b1)

Exponential disentangling [Mod 5, p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1581a55a2c014635adb7198afb587cb2), [Mod 5, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6fc4593eb42441628542a2f758470ce6), [Mod 5, p14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a3881974d47e40569de7c5e445a056c9), [Mod 5, p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cce124a1b2dd416e9eeb64e617e9d8fd), [Mod 6, p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f0d84a6e12614503a5dfc75e9d8e1d30) [Mod. 7, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3aa481abc20a4bd193f92ce7d5f0ea19)

Factorization [Mod 6, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/354edbefd8a14d059a568a22fba73edb),[Mod 6, p4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ba281a817a44712bc2f43dbdf4ce47f), [Mod 7, p53](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6e633642da4bf58a34335ae5608884)

Factorization chain, circle [Mod 7, p33](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e0196061923d4778b9aa65e428ab2751)

Factorization chains [Mod 7, p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7)

Factorization, Cartesian hydrogen [Mod 7, p57](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2e71a962ec05420dad045f4fd109fa7a)

Fermions [Mod 4, p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/df2aa2804a1347509a828846573a3413)

Feynman-Hellmann theorem [Mod 8, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/49853a9716914fc5a8128c2126ece8d4)

Fluctuations [Mod 5, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e4ca12fb7cc4b1cbc8f9441ab10c99f)

Free particle[Mod 5, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/371c0ec2e2234b4cb55f257da7e43096)

Free particle, 3D [Mod 5, p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7cba168195b6497082cd7a4e3e517553)

Gaussian integral [Mod 5, p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8d928e53f54b44d5825a708fa05f1638)

Gaussian wavepacket [Mod 5, p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8d928e53f54b44d5825a708fa05f1638)

Hadamard identity [Mod 6, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b8)

Hadamard lemma [Mod 5, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3941893af52446e992c83c6107fa9cbd)

Hadamard lemma, special case [Mod 5, p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e83e75302bf24cb5b08dd37a7a69ec29)

Hamiltonian [Mod 6, p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/248771ba228e4600af3545ce10ad0bda)

Hamiltonian of a free particle [Mod 5, p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/371c0ec2e2234b4cb55f257da7e43096)

Hamiltonian operator [Mod 6, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b4)

Harmonic Oscillator (see Simple Harmonic Oscillator)

Hermitian conjugate [Mod 1, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f37d9f9da9844f9da1c296851713e7e7)

Hermitian matrix [Mod 1, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f37d9f9da9844f9da1c296851713e7e7)

Heterodyne [Mod 10, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8c12b555fa704729b102b54f372cf8fe), [Mod 10, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a46e05b0f17944bfa63e7ca37a7a9b79)

Hidden variables [Mod 2, p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/05a8718dc13e4502a67d7b2e6c355895), [Mod 2, p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6481424f2aaf4fb3b2a211476ee2a06e)

Homodyne [Mod 10, p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5f3573cb1a2c4a0bbca34a8443696059), [Mod 10, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a46e05b0f17944bfa63e7ca37a7a9b79)

Hong-Ou-Mandel experiment [Mod 4, p27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/208f593125f4460a8232153bcff0807f)

Hydrogen [Mod 7, p43](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3c6563cb01946a3a8866851c261308f), [Mod 7, p44](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d97746bddc9749f3b4b11858be796fb7), [Mod 7, p47](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/444daadf6bb34702ae50d52172a0e1bc), [Mod 8, p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ed406e27acd94fed95663223fb40cd99), [Mod 8, p4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b55024d6b18d4f56888444bf8e9e0e57), [Mod 8, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/aded8fff37024804a1c31030a90fa0f7), [Mod 8, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3d6bc006317a4e4daa31d80106252220), [Mod 8, p10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06a8d3da18164a81bf574a016b07a484), [Mod 8, p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f33108f973064ecfaeed5dd55478aaba)

Hydrogen, degeneracy [Mod 7, p43](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3c6563cb01946a3a8866851c261308f)

Hydrogen, energy eigenstates [Mod 7, p43](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3c6563cb01946a3a8866851c261308f)

Hydrogen, factorization [Mod 7, p43](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3c6563cb01946a3a8866851c261308f)

Muonic hydrogen [Mod 9, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ee581617c1fb49b696b7b1590a0c830f)

Hyperfine structure [Mod 8, p2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b048652809a946c0b1b45772f51d0695), [Mod 8, p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ed406e27acd94fed95663223fb40cd99), [Mod 8, p4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b55024d6b18d4f56888444bf8e9e0e57), [Mod 8, p5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6a9f512889db4f67a9c05b1040519e7f)

Imperfect detectors [Mod 3, p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/01380cdfa71e49d186b4ba5631ab698a)

Interaction free measurement [Mod 4, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f52abb7ed6aa4cb1b8c041cdc098c0d1),[Mod 4, p2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5f01405a595d4e31b46f357c5796c90e), [Mod 4, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ecec2617e274f499f96bfb31adcb381)

Interaction free measurement, efficiency [Mod 4, p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fe53e674dbc74ac3a7e969ff294fc279)

Intertwining [Mod 7, p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7)

Kramers Pasternack relation [Mod 7, p56](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f6719e7f9ebf44b29e3ae7e38ac43cf1), [Mod 8, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52169bd428f64e6a8d46f7d5348eb971), [Mod 8, p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9947fdf023fb4d4e887ff07331a0720e)

Laguerre polynomials [Mod 7, p41](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/85806cb7903b4f82b2632784f9571fa5), [Mod 7, p47](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/444daadf6bb34702ae50d52172a0e1bc)

Landau-Zener problem  [Mod 9, p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%20fed3ab2523004c889b4b397ed4c071bc)

Leibniz rule identity [Mod 2, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/faeea1632f204b7da314b803fa4e4a87)

Lennard Jones Potential [Mod 6, p17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/597eb811572943e7b42acd811a3e3ba4)

Lenses [Mod 3, p23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e8e8fc88471446f1acff6a673e060d02)

Lie algebra [Mod 5, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ce123829238b4446b49bc7b3bc56ef55)

Lie group, non-abelian [Mod 7, p2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5a8fc5552a124c239ebe588e227bf189)

Lie groups [Mod 5, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ce123829238b4446b49bc7b3bc56ef55)

Light, transmission through glass [Mod 3, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/804cc07dd24c45e69910991a7df28ca4)

LIGO [Mod 10, p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/719761c05c684c7c9f5a856391477d5a), [Mod 10, p12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d543fa50830c4a6698b2dd509b9d3709), [Mod 10, 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06078e25d9ac42a0a97c3383114f35b1), [Mod 10, p14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4a3eb93e9dec46c08b097275c141bf51)

Local realism [Mod 2, p32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8df9da8d4c8f44bd84fb939134d6a70c)

Local realism, theory [Mod 2, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8df9da8d4c8f44bd84fb939134d6a70c),[Mod 2, p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e8d71d71c28148f790dc9dcc23fe253e), [Mod 2, p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6481424f2aaf4fb3b2a211476ee2a06e)

Lowering operator [Mod 6, p14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f841cf7667614f8b91443f353e98d4b2), [Mod 6, p18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ee7677c9c104432a4a73854347ac1ab), [Mod 6, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b3), [Mod 6, p29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a6a083767d304b1e9a98f3bc10092fdc)

Mach-Zehnder interferometer [Mod 4, p4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1f2596efcc5c4dd3ad843e5ee176a1dd), [Mod 4, p5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/47e2e7f7ba1d420cbef8de418a1f319b), [Mod 4, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ecec2617e274f499f96bfb31adcb381), [Mod 10, p10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0172abbbcf814643aba1b98415423703)

Mach-Zehnder interferometer, applications [Mod 4, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/dc54e218aac249a898d7b70e487014d0)

Mach-Zehnder interferometer, Dirac approach [Mod 4, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7c65e5da427f4095a2cb4e8556429fa4)

Magnetic field [Mod 1, p4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ea0491ae2c7449a09284f95a25cee73d), [Mod 1, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a29db45ef9304143b11be38746fea898)

Magnetic needles [Mod 1, p5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d112f231826f4f04bc2517a0834b69a8)

Many worlds interpretation  [Mod 2, p34](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/764cf8e30601490b8d2537d7e3a69df9)

Many-body physics [Mod 4, p28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5f801c27a34e4b0cb99aa3df7d046273)

Maxwell's equations [Mod 9, p12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/262e1e8fa6ad49629368ef7dc9af7b43), [Mod 9, p13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9882944253a84e2ea1577fb180b83a26)

Michelson-Morley interferometer [Mod 10, p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/719761c05c684c7c9f5a856391477d5a)

Michelson-Morley experiment [Mod 4, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/dc54e218aac249a898d7b70e487014d0)

Molecular rotation spectroscopy [Mod 7, p16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/46941092d81547c8ab0947f2f46f1d34)

Moment of inertia [Mod 7, p16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/46941092d81547c8ab0947f2f46f1d34)

Momentum

Momentum, eigenstate [Mod 5, p23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a075c99ec62b40b7a14660f166173d8a), [Mod 6, p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b3fb7783cde64d60ab33293cc6e3bd25)

Momentum, operator [Mod 6, p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b3fb7783cde64d60ab33293cc6e3bd25), [Mod 6, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b6)

Morse potential [Mod 6, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fd5322c7b1344ed781ed2f3d06830977), [Mod 6, p35](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2225d89ee17b43ef8d1abc6bb5e06471), [Mod 6, p40](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4e1085b8720a477980eccdf09f6f95fd), [Mod 7, p37](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/85e50051038444dea1e05d7329d63842)

MRI [Mod 2, p29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/841b448dc8004d32a6f736b94f264d8a)

Multiple reflections [Mod 3, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8ce6c5b171b94d6da8ea5b92cd4c188c)

NMR [Mod 2, p 27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8140c0ea36db49098d32d428ff3a022d), [Mod 2, p 28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f2a806aef63b49b3aeb8afc55e80fca3)

Node [Mod 6, p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9ddabd73bfa548cfbf70f89d8d7b4bf3)

Node theorem [Mod 7, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7), [Mod 7, p 21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92d92a096902426dbf8876c37ecd67ca), [Mod 7, p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d034302b9d1d4f5d8bd0d3b3da216f03), [Mod 7, p 23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0947e649fb8c4cec81e8d586389a955b), [Mod 7, p 24](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a249f0a46b0f42e1b47d21cef6945fc5)

Normal ordering [Mod 6, p 18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ee7677c9c104432a4a73854347ac1ab)

Normalization [Mod 3, p 23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e8e8fc88471446f1acff6a673e060d02), [Mod 3, p 24](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f7d01c14a1d448088af70c9bc76455e4)

Partial reflection [Mod 3, p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17ca5bf5b29f49f8a39ce285424f0c71), [Mod 3, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/672e7a66995a4138ab1f549b8ac487ec)

Particle bunching [Mod 4, p 25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06d304136bba48f0b0765fd72c2d89e3)

Pauli spin matrices [Mod 5, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d5bdb09673cf4285b8fcef4a321fb872), [Mod 5, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92150e11a0d24611866ac34bfa656509)

Pauli matrix identities [Mod 5, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6d04009a69547548fc436a87e0787df)

Arbitrary matrices in terms of Pauli spin matrices [Mod 5, p 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6282dc2f45af4ecca0bf6e5b8ec305e6)

Pauli spin matrices, eigenvalues [Mod 5, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92150e11a0d24611866ac34bfa656509)

Pauli spin matrices, triple product [Mod 5, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92150e11a0d24611866ac34bfa656509)

Perturbation theory [Mod 8, p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%205d43bfc742234f99931d14529d85cc74), [Mod 9, p 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/be6eb53ccf284913a29233411b130562)

Perturbation theory, first order [Mod 8, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/49853a9716914fc5a8128c2126ece8d4)

Perturbation theory, second order [Mod 8, p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4cc43742895c419ead83eaf2284316b4)

Phase space [Mod 9, p 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3ba56416ee08466a8aaced1372ca4e5b)

Photomultiplier tube [Mod 10, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17d9b0a478c740e2a760e2123d25e046), [Mod 10, p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3fa44439a51f4b6798041712fe15c1f6)

Photon [Mod 10, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/639705b56cdf4452be85813b0ab6d1aa), [Mod 10, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17d9b0a478c740e2a760e2123d25e046), [Mod 10, p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3fa44439a51f4b6798041712fe15c1f6), [Mod 10, p 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/21ac47e2311046dd90a8fa818d04985b), [Mod 10, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b0f85020ad434d1ea80c506442c71240), [Mod 10, p 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8fc2faec45f8498393b3dd32b2c427f4), [Mod 10, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%200172abbbcf814643aba1b98415423703)

Photon self-reflection [Mod 3, p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d8107e2772c546299a289d708c6c6d91)

Pickering lines [Mod 7, p 44](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d97746bddc9749f3b4b11858be796fb7)

Pickering-Fowler hypothesis [Mod 7, p 44](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d97746bddc9749f3b4b11858be796fb7)

Pilot wave theory [Mod 2, p 34](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/764cf8e30601490b8d2537d7e3a69df9)

Polarization [Mod 4, p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/84a890f1db764d528aa86c9b3f78856b), [Mod 4, p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38f7327b193247d59759017ac1f22a31)

Polarization rotator[Mod 4, p 17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d02d0eb9698a424ba6c63dfdf78d4e14)

Polarization in Dirac notation [Mod 4, p 16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59261d9f300a4e77ae5d342bdd228fcd), [Mod 4, p 18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0293707b42984475b272ed0f22cb8e91)

Polarized beam splitter, [Mod 4, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fe125dd5607f45d9bdc8bb9e16d0dc3c)

Polarized interferometer, [Mod 4, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fe125dd5607f45d9bdc8bb9e16d0dc3c)

Experiments with polarizers [Mod 4, p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38f7327b193247d59759017ac1f22a31), [Mod 4, p 17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d02d0eb9698a424ba6c63dfdf78d4e14), [Mod 4, p 18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0293707b42984475b272ed0f22cb8e91)

Position eigenstate [Mod 5, p 23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a075c99ec62b40b7a14660f166173d8a)

Position operator [Mod 6, p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/770151b7b5784f1b9a1efe69b9e04819), [Mod 6, p 16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52818f14e224491cacad08e0804c9ae8), [Mod 6, p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b5)

Position states in the theta-phi direction [Mod 7, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/657ffe4d315e434c96699944779ad2fd)

Probability [Mod 1, p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38c8ffb321e24e33a7a76c3b8589f709), [Mod 1, p 15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c6afef06a9ce415c972222484c3fc616), [Mod 1, p 16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e6c8dc7009d148caa6824c860791d7d2)

Probability of measurement [Mod 5, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e4ca12fb7cc4b1cbc8f9441ab10c99f)

Projection operator [Mod 2, p 15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fde893880f4b47f09270ee7a7fc43147)

Proton charge radius [Mod 8, p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/de43aa5afea7461db26e673811eafc3f)

Proton mass [Mod 7, p 45](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cb413b2d4ee4484b9d44f755ebbecefc)

Quantum camera [Mod 4, p 21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0e953014408149a2b124bb3f6000a226)

Quantum eraser [Mod 4, p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/84a890f1db764d528aa86c9b3f78856b)

Quantum key distribution [Mod 3, p 29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0363ebe72afb480f85339332c2e84740), [Mod 3, p 30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e54c61b3f3304213b214be9466842d2e)

Quantum mystery [Mod 3, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f6cc8531943f473da0bbe39af85a678f), [Mod 3, p 21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/502e201858954814ae1b3d48d238b1c6)

Quantum numbers [Mod 7, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369), [Mod 7, p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6e338d7608c43b798ffdebe2aa022c6), [Mod 7, p 51](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/eaa3177c30b84459bce137b9d3178b93)

Quantum rotations, general [Mod 7, p 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e699644e5874bd1be948cf224efd49d), [Mod 7, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/657ffe4d315e434c96699944779ad2fd)

Quantum rules for light [Mod 3, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e79bf1bde2254d7aa62b930ee904a4ce)

Quantum seeing in the dark [Mod 2, p 17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/036b21a2e74249a88dd536ab4648d989), [Mod 4, p 7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ecec2617e274f499f96bfb31adcb381), [Mod 4, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/390579cc2f144d5199a3e343df2bf0a9), [Mod 4, p 20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ceef0f0cb0484ce1b74484182110af7a)

Quantum Zeno effect [Mod 4, p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d369617ce7794a1a8e937179260aff8a)

Rabi oscillations [Mod 4, p 32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38e5f25900174f0fad3eac2867376f56)

Radial momentum, [Mod 7, p 30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1c7e0feabfa24ab599dc53e8e59d0054), [Mod 7, p 31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/69e9880155c2464592fbb36ca33ad3c3), [Mod 8, p 9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3d6bc006317a4e4daa31d80106252220)

Radial translation [Mod 7, p 32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/af4d7f35e1a9424ab42822ef73c80b8d)

Radio astronomy [Mod 8, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6a9f512889db4f67a9c05b1040519e7f)

Raising operator [Mod 6, p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f841cf7667614f8b91443f353e98d4b2), [Mod 6, p 18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ee7677c9c104432a4a73854347ac1ab), [Mod 6, p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b2), [Mod 6, p 29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a6a083767d304b1e9a98f3bc10092fdc)

Spin operators

 operator [Mod 2, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8c63ce88f40f439ba6c0fed670d09157)

 operator [Mod 2, p 7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b353bd69c9894f82a5685bb3619049f7)

 operator, eigenvalues and eigenvectors [Mod 2, p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1da9e49a52af49319c9e19a622be2424)

operator (total spin) [Mod 2, p 9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/faeea1632f204b7da314b803fa4e4a87), [Mod 2, p 36](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac6a73a8c03a4d17913e09c028a6c90e)

 operator (total spin), eigenvalues [Mod 2, p 36](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac6a73a8c03a4d17913e09c028a6c90e)

Spin operator matrix, theta-phi direction [Mod 5, p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3246395620344d8852a13039b282b0f)

Schrodinger equation [Mod 8, p 18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6224c9ea1bdc417484af2450b5f4699d)

Schrodinger factorization method [Mod 7, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7), [Mod 7, p 20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f174df015cb84972b0f599cea5632c87)

Separation fallacy [Mod 2, p 25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e15466db77c8415f8fe693313813e5fe)

Separation of variables

Separation of variables, kinetic energy [Mod 7, p 31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/69e9880155c2464592fbb36ca33ad3c3)

Separation of variables in 2 dimensions, [Mod 7, p 36](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/760add9aba4b47a5833c51083158c0cc)

Similarity transform [Mod 5, p 21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e83e75302bf24cb5b08dd37a7a69ec29)

Simple harmonic oscillator [Mod 6, p 7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fd5322c7b1344ed781ed2f3d06830977), [Mod 6, p 8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/248771ba228e4600af3545ce10ad0bda), [Mod 6, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/28ddf98d60f844eeb1d5f413629ac998), [Mod 6, p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b1), [Mod 6, p 26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2e293d28eabe4c5b83e941a1ca6de771), [Mod 6, p 33](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4fcf396347504f2fa756e849b5a93c2a), [Mod 6, p 35](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2225d89ee17b43ef8d1abc6bb5e06471), [Mod 7, p 52](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6e633642da4bf58a34335ae5608884), [Mod 9, p 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%203ba56416ee08466a8aaced1372ca4e5b)

Simple harmonic oscillator in 2 dimensions [Mod 7, p 53](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6e633642da4bf58a34335ae5608884)

Simple harmonic oscillator in 3 dimension [Mod 6, p 32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e8f6905973b84dca850d47e367989167), [Mod 6, p 40](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4e1085b8720a477980eccdf09f6f95fd)

Simple harmonic oscillator, classical [Mod 9, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ae9a799570be43d387460d12b6eb1d44)

Simple harmonic oscillator, factorization [Mod 6, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1bcc8c1487964ecf80bf41a4672a2886)

Simple harmonic oscillator, 3D isotropic [Mod 7, p 39](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4eaa4b5ea6804506a265230b8bf3821a)

Simple harmonic oscillator, 3D isotropic wavefunctions [Mod 7, p 40](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f7bab0091cf94cdeaa46877c00b16cb2), [Mod 7, p 42](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/18b2140c7bd244888da0053ad4324fd1)

Single slit experiment [Mod 3, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/67b7b45faf86462c958b80927d03653a), [Mod 3, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/73a217615d164213bd41a50d90485059), [Mod 3, p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/321033f7a1df4253b115e7b4f548804a), [Mod 3, p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/a67779644d1d4577b778b98cddc614b3/92366face8ce4676bdcbd415240928bb)

Single photon source [Mod 4, p 8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/277641e7721a4c2b8abc18c7703eb22a)

Spherical harmonics [Mod 7, p 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3aa481abc20a4bd193f92ce7d5f0ea19), [Mod 7, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6be0bee54acb46bb9b29bd57efa0ed44), [Mod 7, p 50](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%20cdf6e5f1bddf4dcd99127055dad45a40)

Spherical harmonics, d-wave [Mod 7, p 9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/79521071544c49b1b9d601bc1ca8c243)

Spherical harmonics, orthogonality of [Mod 7, p 17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c0523c942ea24e059a5e0bad7c0c817b)

Spherical harmonics, p-wave [Mod 7, p 8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/146f1621b0e44d7099fa72bb630a9c56)

Spherical harmonics, s-wave [Mod 7, p 7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7528c9f002ee4ea1a1743ed282a172a8)

Spin states

Spin singlet state [Mod 7, p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6e338d7608c43b798ffdebe2aa022c6)

Spin singlet state, arbitrary direction [Mod 7, p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3ee7cd66d2714844ace1ec50a2368091)

Spin triplet state [Mod 7, p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6e338d7608c43b798ffdebe2aa022c6)

Spooky action at a distance, [Mod 2, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0bfd7ca17fac48b28537ed9672fe7c41), [Mod 2, p 32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8df9da8d4c8f44bd84fb939134d6a70c)

Squeezed state [Mod 6, p 28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e1df1eabd2a4f0cb2c106cb46450902), [Mod 6, p 39](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/db8d47fd92144b12908ee018247914da), [Mod 9, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cac284452ff7480a93c6ccc17d3becee), [Mod 9, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec2eac49640c4b3aae9911a673de4630), [Mod 10, p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06078e25d9ac42a0a97c3383114f35b1)

Squeezing operator [Mod 6, p 28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e1df1eabd2a4f0cb2c106cb46450902), [Mod 6, p 29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a6a083767d304b1e9a98f3bc10092fdc), [Mod 6, p 31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/04d764f74d3d433daa4e3647f2a95094), [Mod 6, p 39](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/db8d47fd92144b12908ee018247914da)

Stern-Gerlach

Stern-Gerlach analyzer loop [Mod 2, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2d5f33861d4e466e8d81319f4fd583b2), [Mod 2, p 16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b25af39f3e634ed1a3ded88321383e7d)

Stern-Gerlach, classical [Mod 1, p 7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/84c4898e7a2b4a6388f9c0c6b514dbef)

Stern-Gerlach, rotating [Mod 1, p 23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/57ff6a6e7c724525a13ad779a8ad4fec)

SU(2) algebra [Mod 5, p 7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ce123829238b4446b49bc7b3bc56ef55)

Subsidiary condition [Mod 7, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7), [Mod 7, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/bc5b758cd4924feebf43c4dde51b4bca)

Superposition [Mod 2, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4fb128b5d7414c8f9f7cdb0724ac3c94)

Superpotential [Mod 7, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7)

Symplectic matrix [Mod 5, p 9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6fc4593eb42441628542a2f758470ce6)

Tensor product [Mod 1, p 27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/230ef2d947354062ba184f8b709a2b0b)

Tensor product, Dirac notation [Mod 2, p 24](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d4284cd01a324a3d9fa8c030c7ef8f9d)

Three-slit experiment, [Mod 3, p 21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/502e201858954814ae1b3d48d238b1c6)

Time dependence [Mod 9, p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ed6672655e240feae1fdac534fbd6ff), [Mod 9, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cac284452ff7480a93c6ccc17d3becee), [Mod 9, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec2eac49640c4b3aae9911a673de4630)

Time evolution [Mod 9, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fc35b04a22414a0c8922dcc711942ca9)

Time of flight experiment [Mod 7, p 27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/89b518419f8a4cf585cd135d403cd477), [Mod 7, p 28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f95e8cec00b449b83116fc2a5eca244), [Mod 7, p 29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e39b79d4dc9b4e479d9592d0e00d7ea3)

Transcendental equation [Mod 9, p 9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4c14f2f0260545c6ae904c78f0951f7a)

Trotter formula [Mod 9, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fc35b04a22414a0c8922dcc711942ca9)

Two slit experiment

Two slit experiment, Dirac approach [Mod 3, p 27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d2502a5fdfdd487d800e0d4c0b5b134d), [Mod 3, p 28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e698ddaaa698419ca07415a05ede7402)

Two slit experiment with polarizers [Mod 4, p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d4b550dd35414cbf81e6564ced5be06a), [Mod 4, p 23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ef38d5049b634a548412c2918e8fe809), [Mod 4, p 24](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f247f6e88c934282966b1db107e21567)

Two-body problem, [Mod 7, p 25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52f8b40287de49d19aac2dc78c471d54)

Uncertainty [Mod 7, p 28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f95e8cec00b449b83116fc2a5eca244), [Mod 7, p 29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e39b79d4dc9b4e479d9592d0e00d7ea3)

Uncertainty principle [Mod 6, p 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3e527c5a07e04a9da4f8140a69ac2ff0), [Mod 6, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/28ddf98d60f844eeb1d5f413629ac998), [Mod 8, p 9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3d6bc006317a4e4daa31d80106252220)

Variational principle [Mod 6, p 34](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac78af60faf54e18bba8461846bd726e)

Vector operators [Mod 7, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369), [Mod 7, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5a8fc5552a124c239ebe588e227bf189)

Vector operators, rotations of [Mod 7, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5a8fc5552a124c239ebe588e227bf189), [Mod 7, p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d2f17a4260b54e8fa13824d63c5d0f5b)

Virial theorem [Mod 6, p 6,](https://courses.edx.org/jumptoid/3e527c5a07e04a9da4f8140a69ac2ff0)  [Mod 7, p 54](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d1684a0885094ef9b16a77bb5534a366)

Wave motion [Mod 3, p 26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17a00a75aa7c45608cc407fef91d8991)

Wave-particle duality, [Mod 3, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/154e6d4934c74a89b27447272dfcde93), [Mod 3, p 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ad0c9a7a2aee4da6b706169b24caab44%5D)

Wavefunction [Mod 3, p 25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/22093ebcae6d46a1a906d439415f03e7)

Wavefunction, momentum in position space [Mod 5, p 24](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/539038af033d45ebb594055a28594d21)

Wavefunction, position in momentum space [Mod 5, p 24](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/539038af033d45ebb594055a28594d21)

Wavefunction nodes, [Mod 7, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7)

Waves, [Mod 3, p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/33c78b8c32004d33ab611a7f250ef2e0)

Wheeler's delayed choice experiment [Mod 2, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/351ff9d38b7c49eeb43f3fdcbf2ac5af)

Zeno's paradox [Mod 4, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9b1469f7242e4bada1f3d3c16a5647d7)

Zero fluctuation state [Mod 5, p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e4ca12fb7cc4b1cbc8f9441ab10c99f)

****问题集 1****

1. [一般](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0328d164beac470aad236bf512e0e387) Hermitian 2 x 2 矩阵的特征值和特征向量
2. [完整性](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/230ef2d947354062ba184f8b709a2b0b)

****问题集 2****

1. [等效状态](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a4b10c9f51904ce28cfee2efd20f37e8)
2. [更多自旋本征态](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac6a73a8c03a4d17913e09c028a6c90e)

****问题集 3****

1. [BB84 协议中的量子密钥分发](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0363ebe72afb480f85339332c2e84740)
2. [窃听](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e54c61b3f3304213b214be9466842d2e)

****问题集 4****

1. [拉比振荡](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38e5f25900174f0fad3eac2867376f56)
2. [玻色子的概率和能量](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f71d84f5897042d2bc8c4be95f18dccc)

****问题集 5****

1. [斯特恩·格拉赫](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e33494f3e95e4c68914d8d964680c45c)
2. [泡利矩阵的指数运算](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e0b555fb94d946e5bfd0ec92b3ca5894)
3. [使用泡利恒等式](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/021edab17a704935b25ddc0dcbef6af7)
4. [指数解开](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a3881974d47e40569de7c5e445a056c9)
5. [辛矩阵的指数解缠](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cce124a1b2dd416e9eeb64e617e9d8fd)

****问题集 6****

1. [具有指数的动量交换子](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/da4e130aefe041f88cc501abe0faae45)
2. [编织和指数重新排序](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/704906ab40c14f0e8e24f315ad164975)
3. [Hadamard 矩阵](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8191171aa7bc44188d7fbd6be118457d)
4. [高斯波包](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8d928e53f54b44d5825a708fa05f1638)
5. [自由粒子](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7cba168195b6497082cd7a4e3e517553)

****问题集 7****

1. [圆上的动量状态](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b3fb7783cde64d60ab33293cc6e3bd25)
2. [圆上的位置算子](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52818f14e224491cacad08e0804c9ae8)
3. [Lennard-Jones势](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/597eb811572943e7b42acd811a3e3ba4)
4. [算符和简谐振子](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ee7677c9c104432a4a73854347ac1ab)
5. [不确定](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/28ddf98d60f844eeb1d5f413629ac998)

****问题集 8****

1. [Baker-Campbell Hausdorff公式在简谐振子中的应用](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9f2411c3e683429bbaa8dd90c276773b)
2. [动量空间中的波函数](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9a9525963e87444e90862014530a9c69)
3. [相干态](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/04e9a268abf24ff78b170aa0bcb3c85e)
4. [挤压态](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/db8d47fd92144b12908ee018247914da)
5. [三维简谐振子和氘核](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4e1085b8720a477980eccdf09f6f95fd)

****问题集 9****

1. [贝尔实验的角动量不确定性和隐藏变量](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a3255e90e70c4406be2ef6ff903f6441)
2. [分子旋转光谱](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/46941092d81547c8ab0947f2f46f1d34)
3. [球谐函数的正交性](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c0523c942ea24e059a5e0bad7c0c817b)
4. [因式分解法中的特征态归一化](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5cc8ac0d439a4f8c81bf9aa2e53828e6)
5. [辅助条件和波函数](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/bc5b758cd4924feebf43c4dde51b4bca)

****问题集 10****

1. [圆的因式分解链](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e0196061923d4778b9aa65e428ab2751)
2. [辅助条件和波函数](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6c14bee8514b699ccf07d771c9e1db)
3. [tanh^2势](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f143e1dada7d455aa7cb3f672ba28f03)
4. [二维变量分离](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/760add9aba4b47a5833c51083158c0cc)
5. [莫尔斯势](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/85e50051038444dea1e05d7329d63842)

****问题集 11****

1. [各向同性简谐振子的归一化因子](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9ce6a0d8c28242a1be6a08b6165b8b04)
2. [利用因式分解求二维简谐振子的能量和库仑问题](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6e633642da4bf58a34335ae5608884)
3. [检验库仑定律的有效性](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b055c70af9924bffb6845925948f3c23)
4. [维里定理和原子的大小](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d1684a0885094ef9b16a77bb5534a366)
5. [Kramers-Pasternack 正幂关系](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f6719e7f9ebf44b29e3ae7e38ac43cf1)

****问题集 12****

1. [克莱默斯-帕斯特纳克二世](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52169bd428f64e6a8d46f7d5348eb971)
2. [Kramers-Pasternack 逆矩 3,4,5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9947fdf023fb4d4e887ff07331a0720e)
3. [不确定性和氢](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3d6bc006317a4e4daa31d80106252220)
4. [动量空间中的氢](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06a8d3da18164a81bf574a016b07a484)
5. [动量空间 II 中的氢](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f33108f973064ecfaeed5dd55478aaba)

****问题集 13****

1. [非谐振子的微扰理论](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/be6eb53ccf284913a29233411b130562)
2. [μ子氢](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ee581617c1fb49b696b7b1590a0c830f)
3. [朗道-齐纳问题](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fed3ab2523004c889b4b397ed4c071bc)
4. [二维圆形盒子中的粒子](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4c14f2f0260545c6ae904c78f0951f7a)
5. [压缩态的时间依赖性](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec2eac49640c4b3aae9911a673de4630)

阿贝尔群[Mod 5，p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ce123829238b4446b49bc7b3bc56ef55)

角动量[Mod 7，p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369) ， [Mod 7，p12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6e338d7608c43b798ffdebe2aa022c6)

角动量对易关系[Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

角动量本征态[Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

角动量降低算符[Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

角动量提升算子[Mod 7, p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

角动量，总平方[模 7，p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369)

非谐振子[Mod 9，p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/be6eb53ccf284913a29233411b130562)

Baker Campbell 豪斯多夫恒等式[Mod 6，p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5c6c47369be74e9ba158e1b1bff647ff)

BCH身份，Weyl形式[Mod 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b7)，第22页， [Mod 6，第36页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b7)

巴尔末系列[Mod 7，p44](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d97746bddc9749f3b4b11858be796fb7)

分束器[Mod 4，p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/277641e7721a4c2b8abc18c7703eb22a)

贝尔的实验[Mod 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f9c3e9dcc5e243328ab49cfb893ec682)，第22页

贝尔不等式[Mod 7，p14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/bba344e8d19648da91a9afb29e08ec95) ， [Mod 7，p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a3255e90e70c4406be2ef6ff903f6441)

二项式系数[Mod 4，p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/184dbecb90a145b1b8f847989f360840)

二项式定理[模 4，p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/184dbecb90a145b1b8f847989f360840)

玻色子[Mod 4，p25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06d304136bba48f0b0765fd72c2d89e3) ， [Mod 4，p29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8cfa6aae6f774e8fb35234f481986a2d) ， [Mod 4，p33](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f71d84f5897042d2bc8c4be95f18dccc)

玻色子态，计数[Mod 4，p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/df2aa2804a1347509a828846573a3413) ， [Mod 4，p32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4672799b1a554cf9a06a6412ade2db44)

绑定状态[Mod 8, p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5a64b4b26255462d921e46a952b03627) 、 [Mod 8, p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f76c9e7d0f3d485184447b43f72ac00e) 、 [Mod 8, p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/71c9530289324cca8fc097a845f08dc3) 、 [Mod 8, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/446e2afb1bec4a3686fbfc6204f659c9) 、 [Mod 8, p23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ebb91d7f4f543e5a7133609e2901793)

编织身份[模型 5，p28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/704906ab40c14f0e8e24f315ad164975)

规范交换关系[Mod 5, p17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e7dfc01e6fdc4bf4b0cfaf072661bf91) , [Mod 5, p18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3f370ed711114e13aaed1693f24c8534)

基础变更[模式](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7ce9fc0d0fa04abdac96c8f8ee598f0f) 1，第 22 页

相干态[Mod 6，p27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cf577109ce4643f89ea669652d74d05a) ， [Mod 6，p38](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/04e9a268abf24ff78b170aa0bcb3c85e) ， [Mod 9，p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ed6672655e240feae1fdac534fbd6ff)

坍缩理论[模型 2，p34](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/764cf8e30601490b8d2537d7e3a69df9)

换向器[模型 2，p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cd38009e419440f984eeaa34490671a8)

位置和动量幂的交换子[Mod 5, p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/98b68287f81245c6b8920a6509282342) , [Mod 5, p27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/da4e130aefe041f88cc501abe0faae45)

互补[模型 2，p10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4fb128b5d7414c8f9f7cdb0724ac3c94)

完整性[模型 1，p27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/230ef2d947354062ba184f8b709a2b0b)

复数[模 3，p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17a00a75aa7c45608cc407fef91d8991)

复合概率幅[Mod 4，p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/df51351937a94849aebb9aa166df1bf1)

哥本哈根诠释[Mod 7，第 26 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c2ebe0a360d04129b6c67eaf02ba437f)

库仑问题 Mod 7，p43

库仑波函数[Mod 7，p47](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/444daadf6bb34702ae50d52172a0e1bc) 、 [Mod 7，p48](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2a8ff35d3f0e4d64b33d7fcaa5527cfa) 、 [Mod 7，p49](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e6880cbee6b84020b6a2f69ce6f401cb)

电流环路[模块 1，p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1f22e32d9a7340c38fb9234e8f5d177f)

回旋加速器[Mod 9，第 11 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/dced1ec9aab5423eb0d65526af418fad)

黑暗计数[Mod 4，p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fe53e674dbc74ac3a7e969ff294fc279)

德布罗意波长[模型 5，p25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ba4ac300d9384361b10f1e0ef2ae1379)

退化[模式 6，p40](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4e1085b8720a477980eccdf09f6f95fd)

延迟选择[Mod 2，p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/57dfcf012acd4b8d83cc31c9dbf821b1) ， [Mod 2，p23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/79dd2211d6db426ca4ca5ac894d54889) ， [Mod p25](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e15466db77c8415f8fe693313813e5fe)

氘[Mod 7，p45](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cb413b2d4ee4484b9d44f755ebbecefc) ， [Mod 7，p46](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/07e03fee32a74c9e9ab559c6444d091d)

氘核[Mod 6，第 34 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac78af60faf54e18bba8461846bd726e)

衍射

衍射，双缝[模 3，p16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f2bd17299e684a55ac9c3a2e3993cdc9) ，[模 3，p17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e1005141fda44fb8a92986979b0f7017)

衍射，单缝[Mod 3，p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6c9208c8532544b59672f7aa63259521) ， [Mod 3，p17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e1005141fda44fb8a92986979b0f7017)

衍射光栅[Mod 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d8107e2772c546299a289d708c6c6d91)，第22页

狄拉克符号[Mod 1，p18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0a51e3c1adbd4385a18a0fcffbc0170e) ， [Mod 1，p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f9a97a47f06b46699fb3a58aa12bac38) ， [Mod 1，p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/bc3a530ee71040de86f272f520b9acff) ， [Mod 1，p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7ce9fc0d0fa04abdac96c8f8ee598f0f)

双缝实验[Mod 3，p13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92366face8ce4676bdcbd415240928bb) ， [Mod 3，p18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/419dec5ecf524cbd85e00a9feba10b92) ， [Mod 3，p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f6cc8531943f473da0bbe39af85a678f)

特征值[模 1，p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f37d9f9da9844f9da1c296851713e7e7) ，[模 1，p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0328d164beac470aad236bf512e0e387)

特征向量[Mod 1，p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f37d9f9da9844f9da1c296851713e7e7) ， [Mod 1，p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0328d164beac470aad236bf512e0e387)

电子动量谱[Mod 7, p58](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/727fcbc7f0654f88873fe31ce7ac6170) , [Mod 7, p59](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a10152556a22461e81566c7abea2b3f6) ,[Mod 7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6cda48e77cca4f7ebca05872adcfd1c7)，第 60 页

纠缠[模型 2，p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0bfd7ca17fac48b28537ed9672fe7c41) ，[模型 2，p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b0b3a034d7264ab59899eb71700b80c2)

爱因斯坦·波多尔斯基·罗森实验[Mod 7，第 26 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c2ebe0a360d04129b6c67eaf02ba437f)

EPR 悖论[Mod 2，p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0bfd7ca17fac48b28537ed9672fe7c41) ， [Mod 2，p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/57dfcf012acd4b8d83cc31c9dbf821b1)

指数解缠[Mod 5，p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1581a55a2c014635adb7198afb587cb2) ， [Mod 5，p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6fc4593eb42441628542a2f758470ce6) ， [Mod 5，p14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a3881974d47e40569de7c5e445a056c9) ， [Mod 5，p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cce124a1b2dd416e9eeb64e617e9d8fd) ， [Mod 6，p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f0d84a6e12614503a5dfc75e9d8e1d30) [修改版 7，第 6 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3aa481abc20a4bd193f92ce7d5f0ea19)

因式分解[模 6，p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/354edbefd8a14d059a568a22fba73edb) ，[Mod 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ba281a817a44712bc2f43dbdf4ce47f)，p4 ， [Mod 7，p53](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6e633642da4bf58a34335ae5608884)

因式分解链，圆[模 7，p33](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e0196061923d4778b9aa65e428ab2751)

因式分解链[Mod 7，p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7)

因式分解，笛卡尔氢[模 7，p57](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2e71a962ec05420dad045f4fd109fa7a)

费米子[模型 4，p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/df2aa2804a1347509a828846573a3413)

费曼-赫尔曼定理[Mod 8，p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/49853a9716914fc5a8128c2126ece8d4)

波动[模型 5，p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e4ca12fb7cc4b1cbc8f9441ab10c99f)

自由粒子[Mod 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/371c0ec2e2234b4cb55f257da7e43096)，第26页

自由粒子，3D [Mod 5，p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7cba168195b6497082cd7a4e3e517553)

高斯积分[模5，p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8d928e53f54b44d5825a708fa05f1638)

高斯波包[模型 5，p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8d928e53f54b44d5825a708fa05f1638)

Hadamard 恒等式[Mod 6，p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b8)

Hadamard 引理[Mod 5，p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3941893af52446e992c83c6107fa9cbd)

Hadamard 引理，特殊情况[Mod 5，p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e83e75302bf24cb5b08dd37a7a69ec29)

哈密顿量[Mod 6，p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/248771ba228e4600af3545ce10ad0bda)

自由粒子的哈密顿量[Mod 5，p26](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/371c0ec2e2234b4cb55f257da7e43096)

哈密顿算子[Mod 6，p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b4)

谐振子（参见简单谐振子）

厄米共轭[模 1，p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f37d9f9da9844f9da1c296851713e7e7)

埃尔米特矩阵[Mod 1，p19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f37d9f9da9844f9da1c296851713e7e7)

异差式[Mod 10，p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8c12b555fa704729b102b54f372cf8fe) ， [Mod 10，p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a46e05b0f17944bfa63e7ca37a7a9b79)

隐藏变量[Mod 2，p21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/05a8718dc13e4502a67d7b2e6c355895) ， [Mod 2，p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6481424f2aaf4fb3b2a211476ee2a06e)

零差[Mod 10, p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5f3573cb1a2c4a0bbca34a8443696059) , [Mod 10, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a46e05b0f17944bfa63e7ca37a7a9b79)

Hong-Ou-Mandel实验[Mod 4，p27](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/208f593125f4460a8232153bcff0807f)

氢[Mod 7, p43](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3c6563cb01946a3a8866851c261308f) , [Mod 7, p44](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d97746bddc9749f3b4b11858be796fb7) , [Mod 7, p47](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/444daadf6bb34702ae50d52172a0e1bc) , [Mod 8, p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ed406e27acd94fed95663223fb40cd99) , Mod [8, p4 , Mod](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b55024d6b18d4f56888444bf8e9e0e57) 8 [, p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/aded8fff37024804a1c31030a90fa0f7) , [Mod 8, p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3d6bc006317a4e4daa31d80106252220) , [Mod 8, p10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06a8d3da18164a81bf574a016b07a484) , [Mod 8, p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f33108f973064ecfaeed5dd55478aaba)

氢，简并[模型 7，p43](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3c6563cb01946a3a8866851c261308f)

氢，能量本征态[Mod 7，p43](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3c6563cb01946a3a8866851c261308f)

氢，因式分解[模 7，p43](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3c6563cb01946a3a8866851c261308f)

Muonic 氢[Mod 9，p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ee581617c1fb49b696b7b1590a0c830f)

超精细结构[Mod 8, p2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b048652809a946c0b1b45772f51d0695) , [Mod 8, p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ed406e27acd94fed95663223fb40cd99) , [Mod 8, p4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b55024d6b18d4f56888444bf8e9e0e57) , [Mod 8, p5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6a9f512889db4f67a9c05b1040519e7f)

不完美探测器[Mod 3，p20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/01380cdfa71e49d186b4ba5631ab698a)

无相互作用测量[模型 4，p1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f52abb7ed6aa4cb1b8c041cdc098c0d1) ，[模式](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5f01405a595d4e31b46f357c5796c90e) 4，p2 ，[模式 4，p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ecec2617e274f499f96bfb31adcb381)

无交互测量，效率[模型 4，p3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fe53e674dbc74ac3a7e969ff294fc279)

交织[模式 7，第 11 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7)

克莱默帕斯特纳克关系[Mod 7, p56](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f6719e7f9ebf44b29e3ae7e38ac43cf1) , [Mod 8, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52169bd428f64e6a8d46f7d5348eb971) , [Mod 8, p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9947fdf023fb4d4e887ff07331a0720e)

拉盖尔多项式[Mod 7, p41](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/85806cb7903b4f82b2632784f9571fa5) , [Mod 7, p47](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/444daadf6bb34702ae50d52172a0e1bc)

Landau-Zener 问题[Mod 9，p8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%20fed3ab2523004c889b4b397ed4c071bc)

莱布尼茨规则恒等式[Mod 2，p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/faeea1632f204b7da314b803fa4e4a87)

Lennard Jones 势[模型 6，p17](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/597eb811572943e7b42acd811a3e3ba4)

镜头[模组 3，p23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e8e8fc88471446f1acff6a673e060d02)

李代数[Mod 5，p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ce123829238b4446b49bc7b3bc56ef55)

非阿贝尔李群[Mod 7，p2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5a8fc5552a124c239ebe588e227bf189)

李群[Mod 5，p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ce123829238b4446b49bc7b3bc56ef55)

光，透过玻璃[模型 3，p6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/804cc07dd24c45e69910991a7df28ca4)

LIGO[模组 10、p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/719761c05c684c7c9f5a856391477d5a) 、[模组 10、p12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d543fa50830c4a6698b2dd509b9d3709) 、[模组 10、13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06078e25d9ac42a0a97c3383114f35b1) 、[模组 10、p14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4a3eb93e9dec46c08b097275c141bf51)

局部现实主义[模型 2，p32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8df9da8d4c8f44bd84fb939134d6a70c)

局部现实主义，理论[模型 2，p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8df9da8d4c8f44bd84fb939134d6a70c) ，[修改版](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e8d71d71c28148f790dc9dcc23fe253e) 2，第 30 页，[修改版 2，第 31 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6481424f2aaf4fb3b2a211476ee2a06e)

降低运算符[Mod 6, p14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f841cf7667614f8b91443f353e98d4b2) , [Mod 6, p18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ee7677c9c104432a4a73854347ac1ab) , [Mod 6, p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b3) , [Mod 6, p29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a6a083767d304b1e9a98f3bc10092fdc)

马赫-曾德尔干涉仪[Mod 4, p4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1f2596efcc5c4dd3ad843e5ee176a1dd) , [Mod 4, p5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/47e2e7f7ba1d420cbef8de418a1f319b) , [Mod 4, p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ecec2617e274f499f96bfb31adcb381) , [Mod 10, p10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0172abbbcf814643aba1b98415423703)

马赫-曾德干涉仪，应用[模型 4，第 6 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/dc54e218aac249a898d7b70e487014d0)

马赫-曾德干涉仪，狄拉克方法， [Mod 4，p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7c65e5da427f4095a2cb4e8556429fa4)

磁场[Mod 1，p4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ea0491ae2c7449a09284f95a25cee73d) ， [Mod 1，p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a29db45ef9304143b11be38746fea898)

磁针[模型 1，p5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d112f231826f4f04bc2517a0834b69a8)

多世界诠释[模型 2，第 34 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/764cf8e30601490b8d2537d7e3a69df9)

多体物理学[模型 4，p28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5f801c27a34e4b0cb99aa3df7d046273)

麦克斯韦方程组[Mod 9，p12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/262e1e8fa6ad49629368ef7dc9af7b43) ， [Mod 9，p13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9882944253a84e2ea1577fb180b83a26)

迈克尔逊-莫雷干涉仪[Mod 10，p11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/719761c05c684c7c9f5a856391477d5a)

迈克尔逊-莫雷实验[模型 4，第 6 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/dc54e218aac249a898d7b70e487014d0)

分子旋转光谱法[Mod 7，p16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/46941092d81547c8ab0947f2f46f1d34)

转动惯量[Mod 7，p16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/46941092d81547c8ab0947f2f46f1d34)

势头

动量，本征态[Mod 5，p23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a075c99ec62b40b7a14660f166173d8a) ， [Mod 6，p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b3fb7783cde64d60ab33293cc6e3bd25)

动量，算子[Mod 6，p15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b3fb7783cde64d60ab33293cc6e3bd25) ， [Mod 6，p22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b6)

莫尔斯势[Mod 6，p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fd5322c7b1344ed781ed2f3d06830977) ， [Mod 6，p35](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2225d89ee17b43ef8d1abc6bb5e06471) ， [Mod 6，p40](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4e1085b8720a477980eccdf09f6f95fd) ， [Mod 7，p37](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/85e50051038444dea1e05d7329d63842)

MRI [Mod 2，第29页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/841b448dc8004d32a6f736b94f264d8a)

多次反射[模型 3，p7](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8ce6c5b171b94d6da8ea5b92cd4c188c)

NMR [Mod 2，第 27 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8140c0ea36db49098d32d428ff3a022d)， [Mod 2，第 28 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f2a806aef63b49b3aeb8afc55e80fca3)

Node [Mod 6，第 12 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/9ddabd73bfa548cfbf70f89d8d7b4bf3)

节点定理[Mod 7，p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7) ， [Mod 7，p 21](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92d92a096902426dbf8876c37ecd67ca) ， [Mod 7，p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d034302b9d1d4f5d8bd0d3b3da216f03) ， [Mod 7，p 23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0947e649fb8c4cec81e8d586389a955b) ， [Mod 7，p 24](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a249f0a46b0f42e1b47d21cef6945fc5)

正常排序[Mod 6，第 18 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ee7677c9c104432a4a73854347ac1ab)

规范化[Mod 3，p 23](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e8e8fc88471446f1acff6a673e060d02) ， [Mod 3，p 24](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f7d01c14a1d448088af70c9bc76455e4)

部分反射[模 3，p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17ca5bf5b29f49f8a39ce285424f0c71) ，[模 3，p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/672e7a66995a4138ab1f549b8ac487ec)

粒子聚束[模型 4，第 25 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06d304136bba48f0b0765fd72c2d89e3)

泡利自旋矩阵[Mod 5, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d5bdb09673cf4285b8fcef4a321fb872) , [Mod 5, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92150e11a0d24611866ac34bfa656509)

泡利矩阵恒等式[Mod 5，p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6d04009a69547548fc436a87e0787df)

用泡利自旋矩阵表示的任意矩阵[Mod 5，p 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6282dc2f45af4ecca0bf6e5b8ec305e6)

泡利自旋矩阵，特征值[Mod 5，p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92150e11a0d24611866ac34bfa656509)

泡利自旋矩阵，三重积[模 5，p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/92150e11a0d24611866ac34bfa656509)

微扰理论[Mod 8，p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%205d43bfc742234f99931d14529d85cc74) ， [Mod 9，p 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/be6eb53ccf284913a29233411b130562)

微扰论，一阶[Mod 8，p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/49853a9716914fc5a8128c2126ece8d4)

微扰论，二阶[Mod 8，第 12 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4cc43742895c419ead83eaf2284316b4)

相空间[模型 9，第 4 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3ba56416ee08466a8aaced1372ca4e5b)

光电倍增管[Mod 10，p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17d9b0a478c740e2a760e2123d25e046) ， [Mod 10，p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3fa44439a51f4b6798041712fe15c1f6)

光子[Mod 10, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/639705b56cdf4452be85813b0ab6d1aa) , [Mod 10, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17d9b0a478c740e2a760e2123d25e046) , [Mod 10,](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3fa44439a51f4b6798041712fe15c1f6) p [3 , Mod 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/21ac47e2311046dd90a8fa818d04985b) , p 4 [, Mod 10, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b0f85020ad434d1ea80c506442c71240) , [Mod 10, p 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8fc2faec45f8498393b3dd32b2c427f4) , [Mod 10, p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%200172abbbcf814643aba1b98415423703)

光子自反射[模型 3，第 22 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d8107e2772c546299a289d708c6c6d91)

Pickering Lines [7 型，第 44 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d97746bddc9749f3b4b11858be796fb7)

Pickering-Fowler 假设[Mod 7，第 44 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d97746bddc9749f3b4b11858be796fb7)

导航波理论[Mod 2，第 34 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/764cf8e30601490b8d2537d7e3a69df9)

极化[模型 4，第 12 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/84a890f1db764d528aa86c9b3f78856b)，[模型 4，第 13 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38f7327b193247d59759017ac1f22a31)

偏振旋转器[Mod 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d02d0eb9698a424ba6c63dfdf78d4e14)，第 17 页

狄拉克符号中的极化[Mod 4，p 16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59261d9f300a4e77ae5d342bdd228fcd) ， [Mod 4，p 18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0293707b42984475b272ed0f22cb8e91)

偏振分束器， [Mod 4，第 19 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fe125dd5607f45d9bdc8bb9e16d0dc3c)

偏振干涉仪， [Mod 4，第 19 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fe125dd5607f45d9bdc8bb9e16d0dc3c)

使用偏振器进行实验[，第 4 页，第 13 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38f7327b193247d59759017ac1f22a31)，[第 4 页，第 17 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d02d0eb9698a424ba6c63dfdf78d4e14)，[第 4 页，第 18 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0293707b42984475b272ed0f22cb8e91)

位置本征态[Mod 5，第 23 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a075c99ec62b40b7a14660f166173d8a)

位置运算符[Mod 6，p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/770151b7b5784f1b9a1efe69b9e04819) ， [Mod 6，p 16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52818f14e224491cacad08e0804c9ae8) ， [Mod 6，p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b5)

在 theta-phi 方向的位置状态[Mod 7, p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/657ffe4d315e434c96699944779ad2fd)

概率[模 1，p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38c8ffb321e24e33a7a76c3b8589f709) ，[模 1，p 15](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c6afef06a9ce415c972222484c3fc616) ，[模 1，p 16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e6c8dc7009d148caa6824c860791d7d2)

测量概率[模型 5，第 19 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e4ca12fb7cc4b1cbc8f9441ab10c99f)

投影算子[Mod 2，第 15 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fde893880f4b47f09270ee7a7fc43147)

质子电荷半径[Mod 8，第 13 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/de43aa5afea7461db26e673811eafc3f)

质子质量[模型 7，第 45 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cb413b2d4ee4484b9d44f755ebbecefc)

量子相机[Mod 4，第 21 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0e953014408149a2b124bb3f6000a226)

量子擦除器[Mod 4，第 12 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/84a890f1db764d528aa86c9b3f78856b)

量子密钥分发[Mod 3，p 29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0363ebe72afb480f85339332c2e84740) ， [Mod 3，p 30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e54c61b3f3304213b214be9466842d2e)

量子之谜[Mod 3，第 19 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f6cc8531943f473da0bbe39af85a678f)， [Mod 3，第 21 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/502e201858954814ae1b3d48d238b1c6)

量子数[Mod 7，p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369) 、 [Mod 7，p 12](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6e338d7608c43b798ffdebe2aa022c6) 、 [Mod 7，p 51](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/eaa3177c30b84459bce137b9d3178b93)

量子旋转，一般[Mod 7，p 4](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e699644e5874bd1be948cf224efd49d) ， [Mod 7，p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/657ffe4d315e434c96699944779ad2fd)

光的量子规则[Mod 3，p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e79bf1bde2254d7aa62b930ee904a4ce)

黑暗中的量子视觉[模式 2，第 17 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/036b21a2e74249a88dd536ab4648d989)，[模式 4，第 7 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2ecec2617e274f499f96bfb31adcb381)，[模式 4，第 10 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/390579cc2f144d5199a3e343df2bf0a9)，[模式 4，第 20 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ceef0f0cb0484ce1b74484182110af7a)

量子芝诺效应[Mod 4，第 14 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d369617ce7794a1a8e937179260aff8a)

Rabi振荡[模型4，第32页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/38e5f25900174f0fad3eac2867376f56)

径向动量， [Mod 7，p30](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1c7e0feabfa24ab599dc53e8e59d0054) ， [Mod 7，p31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/69e9880155c2464592fbb36ca33ad3c3) ， [Mod 8，p9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3d6bc006317a4e4daa31d80106252220)

径向平移[模型 7，第 32 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/af4d7f35e1a9424ab42822ef73c80b8d)

射电天文学[Mod 8，第 5 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6a9f512889db4f67a9c05b1040519e7f)

升序运算符[Mod 6，p 14](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f841cf7667614f8b91443f353e98d4b2) ， [Mod 6，p 18](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ee7677c9c104432a4a73854347ac1ab) ， [Mod 6，p 22](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b2) ， [Mod 6，p 29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a6a083767d304b1e9a98f3bc10092fdc)

自旋算子

 运算符[Mod 2，第 5 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8c63ce88f40f439ba6c0fed670d09157)

 运算符[Mod 2，第 7 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b353bd69c9894f82a5685bb3619049f7)

 运算符、特征值和特征向量[Mod 2，p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1da9e49a52af49319c9e19a622be2424)

运算符（总自旋） [Mod 2，p 9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/faeea1632f204b7da314b803fa4e4a87) ， [Mod 2，p 36](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac6a73a8c03a4d17913e09c028a6c90e)

 算符（总自旋），特征值[Mod 2，p 36](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac6a73a8c03a4d17913e09c028a6c90e)

自旋算子矩阵，theta-phi 方向[Mod 5，p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c3246395620344d8852a13039b282b0f)

薛定谔方程[Mod 8，第 18 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6224c9ea1bdc417484af2450b5f4699d)

薛定谔分解法[Mod 7, p 11](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7) , [Mod 7, p 20](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f174df015cb84972b0f599cea5632c87)

分离谬误[模型 2，第 25 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e15466db77c8415f8fe693313813e5fe)

变量分离

变量分离，动能[模型 7，第 31 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/69e9880155c2464592fbb36ca33ad3c3)

二维变量分离， [Mod 7，第 36 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/760add9aba4b47a5833c51083158c0cc)

相似变换[Mod 5，第 21 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e83e75302bf24cb5b08dd37a7a69ec29)

简谐振动[模 6，第 7 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fd5322c7b1344ed781ed2f3d06830977)，[模 6，第 8 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/248771ba228e4600af3545ce10ad0bda)，[模 6，第 19 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/28ddf98d60f844eeb1d5f413629ac998)，[模 6，第 22 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/59c3a180ae354cf6b1a55f41c59725b1)，[模 6，第 26 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2e293d28eabe4c5b83e941a1ca6de771)，[模 6，第 33 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4fcf396347504f2fa756e849b5a93c2a)，[模 6，第 35 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2225d89ee17b43ef8d1abc6bb5e06471)，[模 7，第 52 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6e633642da4bf58a34335ae5608884)，[模 9，第 4 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%203ba56416ee08466a8aaced1372ca4e5b)

二维简谐振子[Mod 7，第 53 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f6e633642da4bf58a34335ae5608884)

三维简谐振子[Mod 6，p 32](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e8f6905973b84dca850d47e367989167) ， [Mod 6，p 40](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4e1085b8720a477980eccdf09f6f95fd)

简谐振子，经典[Mod 9，第 2 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ae9a799570be43d387460d12b6eb1d44)

简谐振子，因式分解[Mod 6，第 10 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1bcc8c1487964ecf80bf41a4672a2886)

简谐振子，3D各向同性[Mod 7，第39页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4eaa4b5ea6804506a265230b8bf3821a)

简谐振子，三维各向同性波函数[Mod 7，p 40](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f7bab0091cf94cdeaa46877c00b16cb2) ， [Mod 7，p 42](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/18b2140c7bd244888da0053ad4324fd1)

单缝实验[Mod 3，第 10 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/67b7b45faf86462c958b80927d03653a)， [Mod 3，第 11 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/73a217615d164213bd41a50d90485059)， [Mod 3，第 12 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/321033f7a1df4253b115e7b4f548804a)， [Mod 3，第 13 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/a67779644d1d4577b778b98cddc614b3/92366face8ce4676bdcbd415240928bb)

单光子源[Mod 4，第 8 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/277641e7721a4c2b8abc18c7703eb22a)

球谐函数[Mod 7，p 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3aa481abc20a4bd193f92ce7d5f0ea19) ， [Mod 7，p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6be0bee54acb46bb9b29bd57efa0ed44) ， [Mod 7，p 50](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/%20cdf6e5f1bddf4dcd99127055dad45a40)

球谐函数，d-wave [Mod 7，第 9 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/79521071544c49b1b9d601bc1ca8c243)

球谐函数，[模 7 的正交性，第 17 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/c0523c942ea24e059a5e0bad7c0c817b)

球谐函数，p 波[模型 7，p 8](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/146f1621b0e44d7099fa72bb630a9c56)

球谐函数，s 波[模型 7，第 7 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/7528c9f002ee4ea1a1743ed282a172a8)

自旋态

自旋单重态[Mod 7，第 12 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6e338d7608c43b798ffdebe2aa022c6)

自旋单重态，任意方向[Mod 7, p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3ee7cd66d2714844ace1ec50a2368091)

自旋三重态[Mod 7，第 12 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b6e338d7608c43b798ffdebe2aa022c6)

远距离的幽灵行为， [Mod 2，第 19 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0bfd7ca17fac48b28537ed9672fe7c41)， [Mod 2，第 32 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/8df9da8d4c8f44bd84fb939134d6a70c)

挤压态[Mod 6，p 28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e1df1eabd2a4f0cb2c106cb46450902) ， [Mod 6，p 39](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/db8d47fd92144b12908ee018247914da) ， [Mod 9，p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cac284452ff7480a93c6ccc17d3becee) ， [Mod 9，p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec2eac49640c4b3aae9911a673de4630) ， [Mod 10，p 13](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/06078e25d9ac42a0a97c3383114f35b1)

挤压算子[Mod 6, p 28](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e1df1eabd2a4f0cb2c106cb46450902) , [Mod 6, p 29](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/a6a083767d304b1e9a98f3bc10092fdc) , [Mod 6, p 31](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/04d764f74d3d433daa4e3647f2a95094) , [Mod 6, p 39](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/db8d47fd92144b12908ee018247914da)

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Stern-Gerlach 分析器回路[Mod 2，p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/2d5f33861d4e466e8d81319f4fd583b2) ， [Mod 2，p 16](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/b25af39f3e634ed1a3ded88321383e7d)

Stern-Gerlach，古典[Mod 1，第7页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/84c4898e7a2b4a6388f9c0c6b514dbef)

Stern-Gerlach，旋转[模型 1，第 23 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/57ff6a6e7c724525a13ad779a8ad4fec)

SU(2) 代数[Mod 5，第 7 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ce123829238b4446b49bc7b3bc56ef55)

补充条件[Mod 7，第 11 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7)， [Mod 7，第 19 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/bc5b758cd4924feebf43c4dde51b4bca)

叠加[模型 2，第 10 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4fb128b5d7414c8f9f7cdb0724ac3c94)

超势[模型 7，第 11 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0ad2ee516aec458fa0f62958a68812f7)

辛矩阵[Mod 5，第 9 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6fc4593eb42441628542a2f758470ce6)

张量积[模 1，第 27 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/230ef2d947354062ba184f8b709a2b0b)

张量积，狄拉克符号[Mod 2，第 24 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d4284cd01a324a3d9fa8c030c7ef8f9d)

三缝实验， [Mod 3，第21页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/502e201858954814ae1b3d48d238b1c6)

时间依赖性[Mod 9，p 3](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/6ed6672655e240feae1fdac534fbd6ff) ， [Mod 9，p 5](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/cac284452ff7480a93c6ccc17d3becee) ， [Mod 9，p 10](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec2eac49640c4b3aae9911a673de4630)

时间演化[模型 9，第 1 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fc35b04a22414a0c8922dcc711942ca9)

飞行时间实验[Mod 7，第 27 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/89b518419f8a4cf585cd135d403cd477)， [Mod 7，第 28 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f95e8cec00b449b83116fc2a5eca244)， [Mod 7，第 29 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e39b79d4dc9b4e479d9592d0e00d7ea3)

超越方程[Mod 9，第 9 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/4c14f2f0260545c6ae904c78f0951f7a)

Trotter 公式[Mod 9，第 1 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/fc35b04a22414a0c8922dcc711942ca9)

双缝实验

双缝实验，狄拉克方法， [Mod 3，第 27 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d2502a5fdfdd487d800e0d4c0b5b134d)， [Mod 3，第 28 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e698ddaaa698419ca07415a05ede7402)

使用偏振器的双缝实验[Mod 4，第 22 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d4b550dd35414cbf81e6564ced5be06a)， [Mod 4，第 23 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ef38d5049b634a548412c2918e8fe809)， [Mod 4，第 24 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/f247f6e88c934282966b1db107e21567)

二体问题， [Mod 7，第 25 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/52f8b40287de49d19aac2dc78c471d54)

不确定性[Mod 7，第 28 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/0f95e8cec00b449b83116fc2a5eca244)， [Mod 7，第 29 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/e39b79d4dc9b4e479d9592d0e00d7ea3)

不确定性原理[Mod 6，p 6](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3e527c5a07e04a9da4f8140a69ac2ff0) ， [Mod 6，p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/28ddf98d60f844eeb1d5f413629ac998) ， [Mod 8，p 9](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/3d6bc006317a4e4daa31d80106252220)

变分原理[Mod 6，第 34 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ac78af60faf54e18bba8461846bd726e)

向量运算符[Mod 7, p 1](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/ec8cc48a28b74fc9a3e61b2bde705369) 、 [Mod 7, p 2](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5a8fc5552a124c239ebe588e227bf189)

向量运算符， [Mod 7, p 2的旋转](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/5a8fc5552a124c239ebe588e227bf189)， [Mod 7, p 3 的旋转](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d2f17a4260b54e8fa13824d63c5d0f5b)

Virial 定理[Mod 6，第 6 页，](https://courses.edx.org/jumptoid/3e527c5a07e04a9da4f8140a69ac2ff0)  [Mod 7，第 54 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/d1684a0885094ef9b16a77bb5534a366)

波动[模型 3，第 26 页](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/17a00a75aa7c45608cc407fef91d8991)

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零波动状态[Mod 5，p 19](https://courses.edx.org/courses/course-v1:GeorgetownX+PHYSICS-253+2T2025/jump_to_id/1e4ca12fb7cc4b1cbc8f9441ab10c99f)