

## 7 Postulates of quantum mechanics

- $|\psi\rangle$ , the “ket” *completely describes the system*. The “ket” resides in some linear vector space, which we may depict as  $V$ .
- A measurable quantity is described mathematically through an operator, say  $\mathcal{A}$ . The measurement is fully described by the action of the operator  $\mathcal{A}$  on a complete set of elements in  $V$ . The expectation value of such a measurement is given by the bra-ket  $\langle\psi|\mathcal{A}|\psi\rangle$ , which is known as the expectation value of  $\mathcal{A}$  with respect to  $|\psi\rangle$ .
- Any given measurement can only result in one of the eigenstates of the operator  $\mathcal{A}$ .
- The probability of the measurement yielding the eigenstate  $|a_n\rangle$  of  $\mathcal{A}$  is  $|\langle a_n|\psi\rangle|^2$ .

**Homework:** As stated in class, justify the stated postulates through your knowledge of the Stern-Gerlach experiments.