CEN/CLC/JTC 22/WG 3 "Quantum Computing and Simulation"
WG Secretariat: **AFNOR**
Convenor: **Lefebvre Catherine Mrs**

CEN-CLC-JTC 22-WG 3_N66_Rationale_behind_Layermodel__v02 by R.Vandenbrink

Document type	Related content	Document date	Expected action
Meeting / Document for discussion	Meeting: VIRTUAL 21 Mar 2024	2024-03-15	

Rationale behind a layer model for QC

why do we need that?

Delft Circuits
Hardware for quantum engineers

Rob F.M. van den Brink
21 march 2024

Why a layer model?

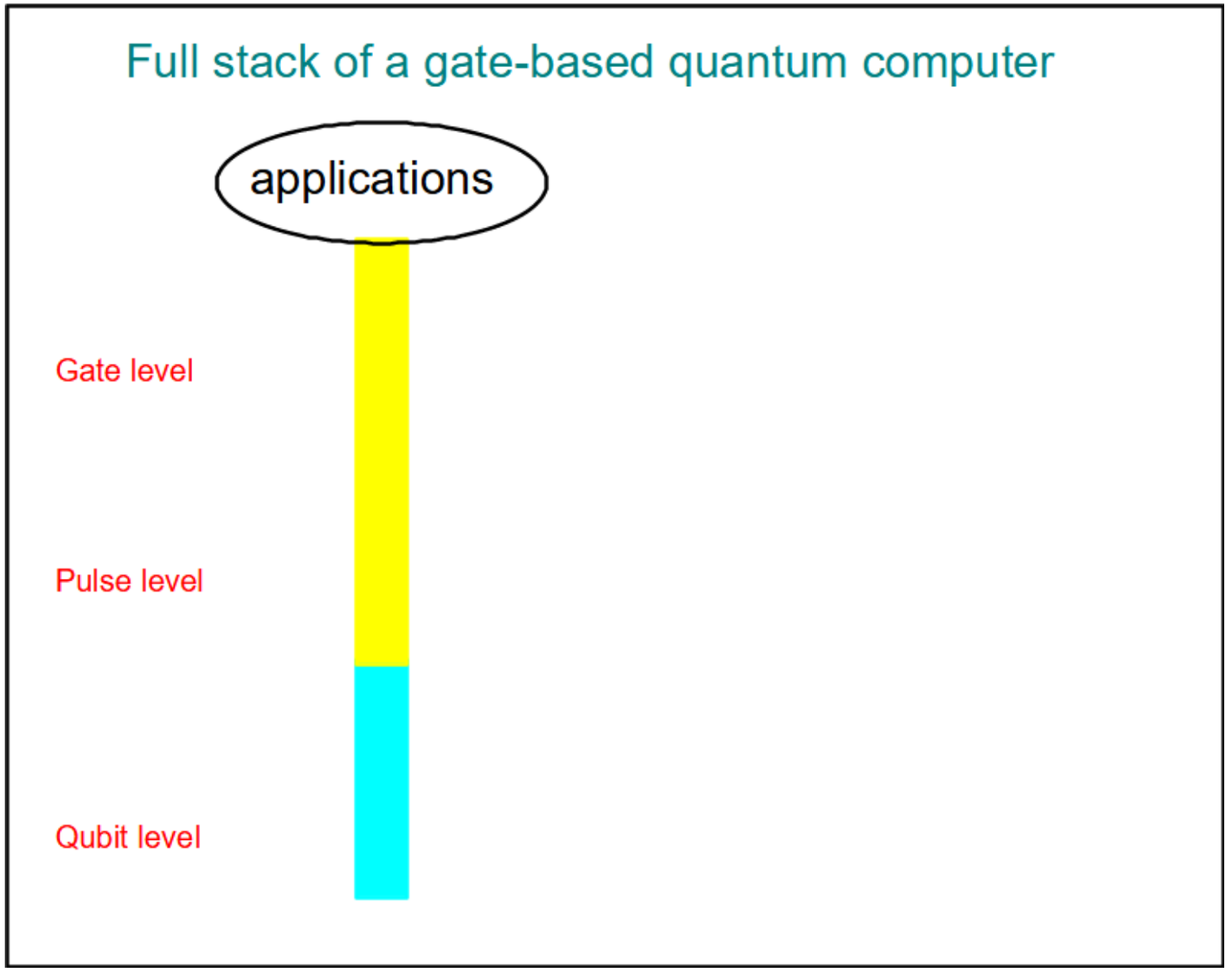
To enable Modularity

- Customers can combine product from different vendors
- Customers can upgrade by exchanging hardware/software modules
- Vendors will increase sales due to a global market
- Innovation is stimulated since the best modules can be selected
- No customer lock-in to a single monolithic solution

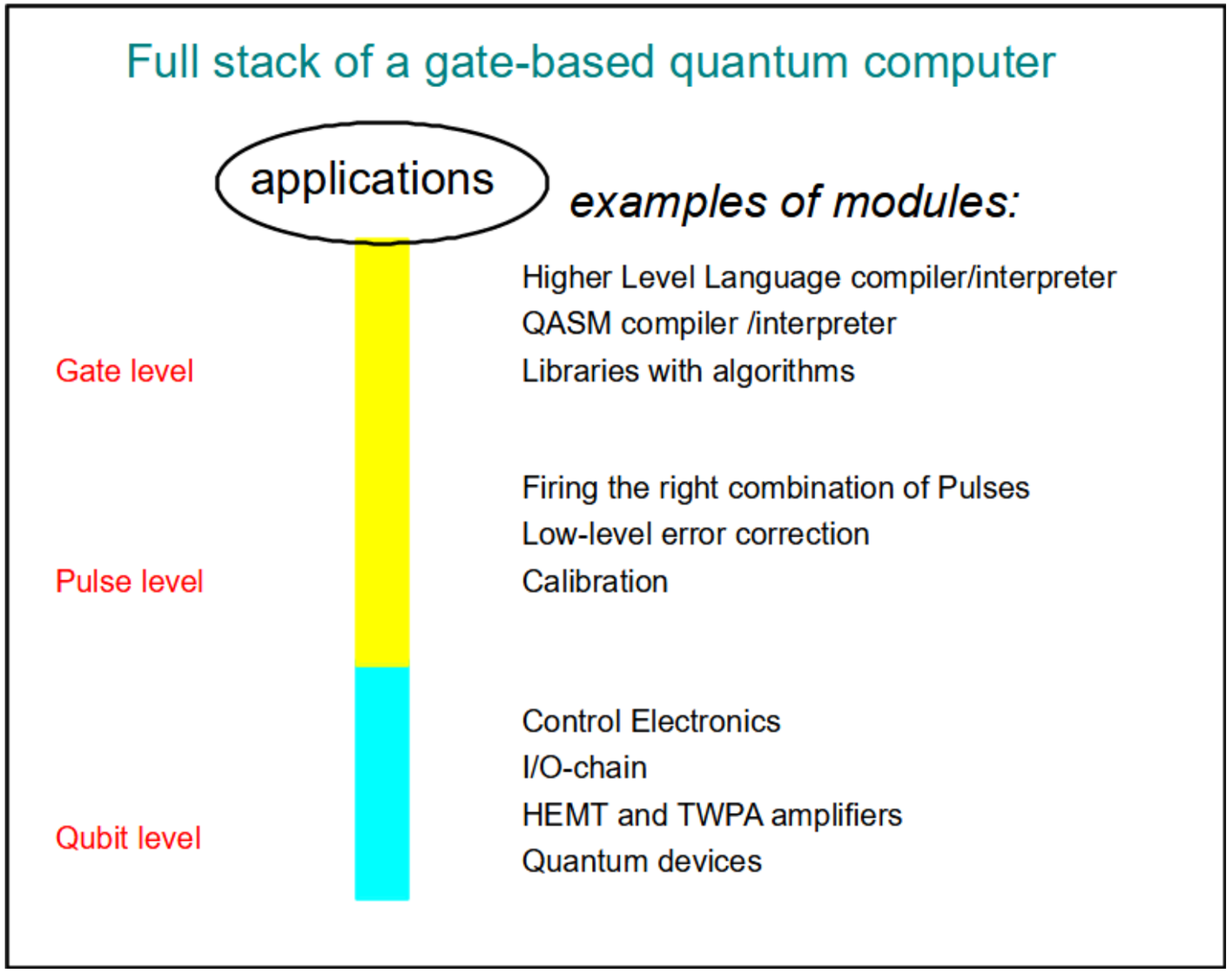
What is needed for that?

- Modules that can interwork with each other
- Interfaces between those modules that are compatible
- Layer model, to identify interfaces and functionality of modules

Example: gate-based quantum computers



Example: gate-based quantum computers



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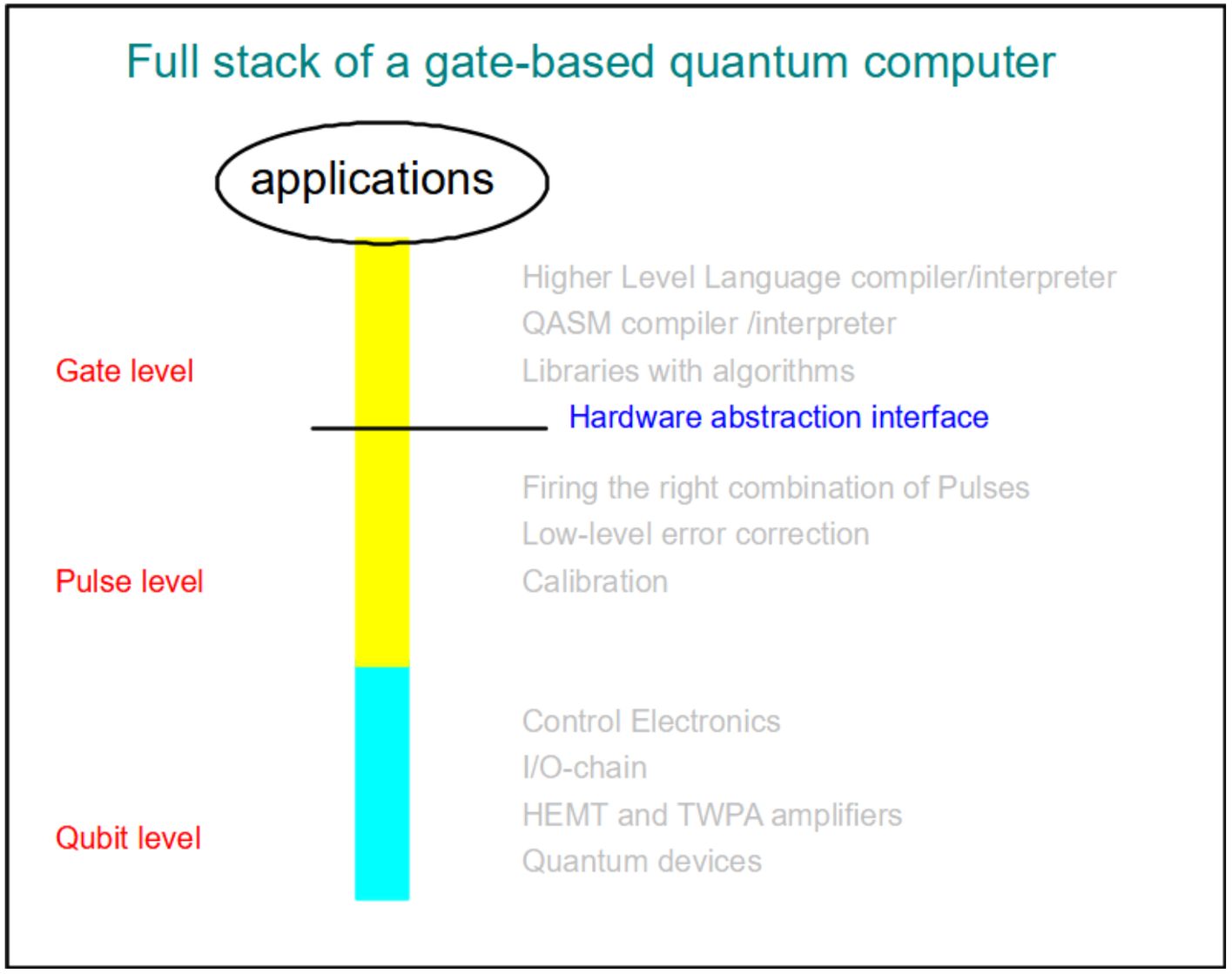

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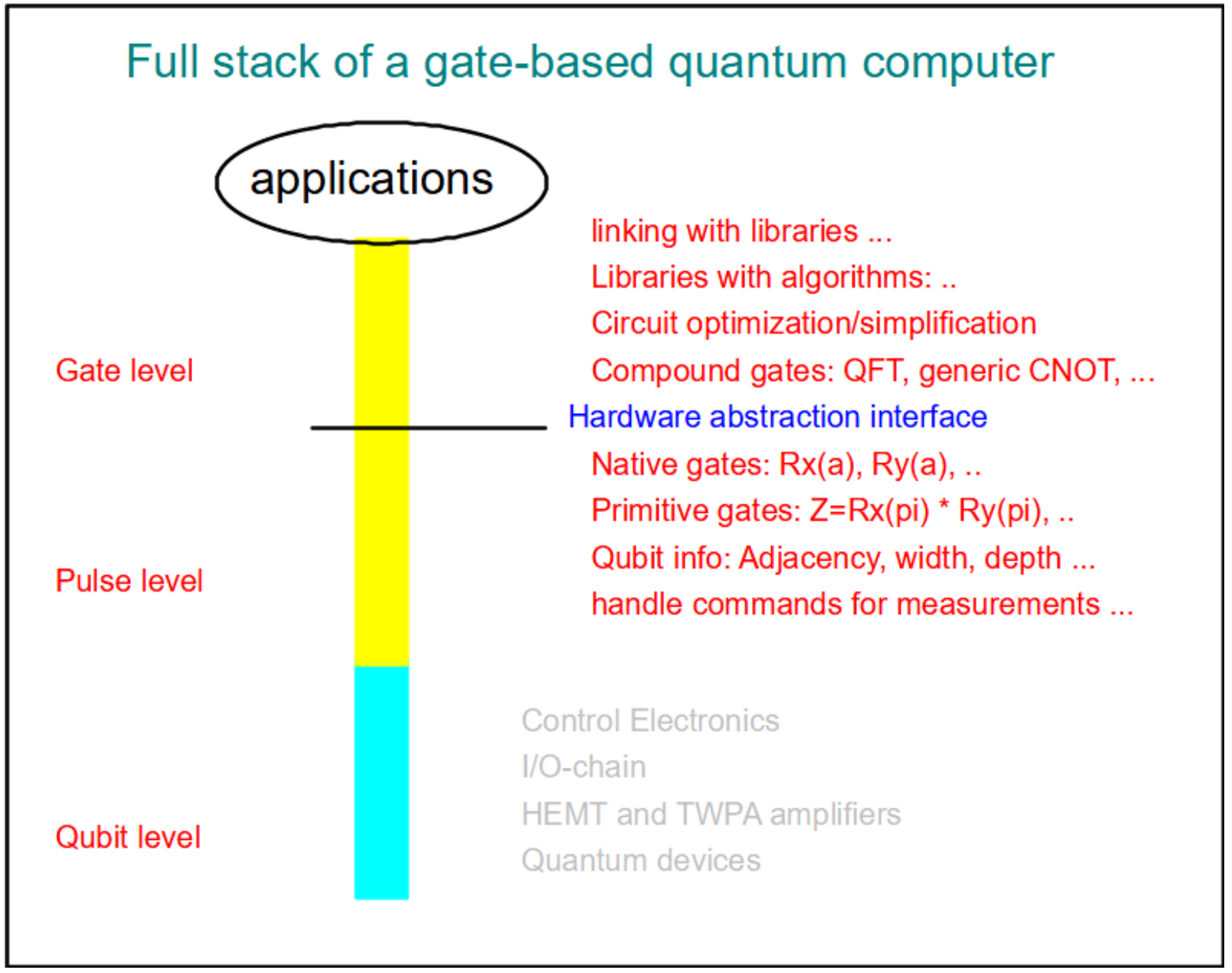

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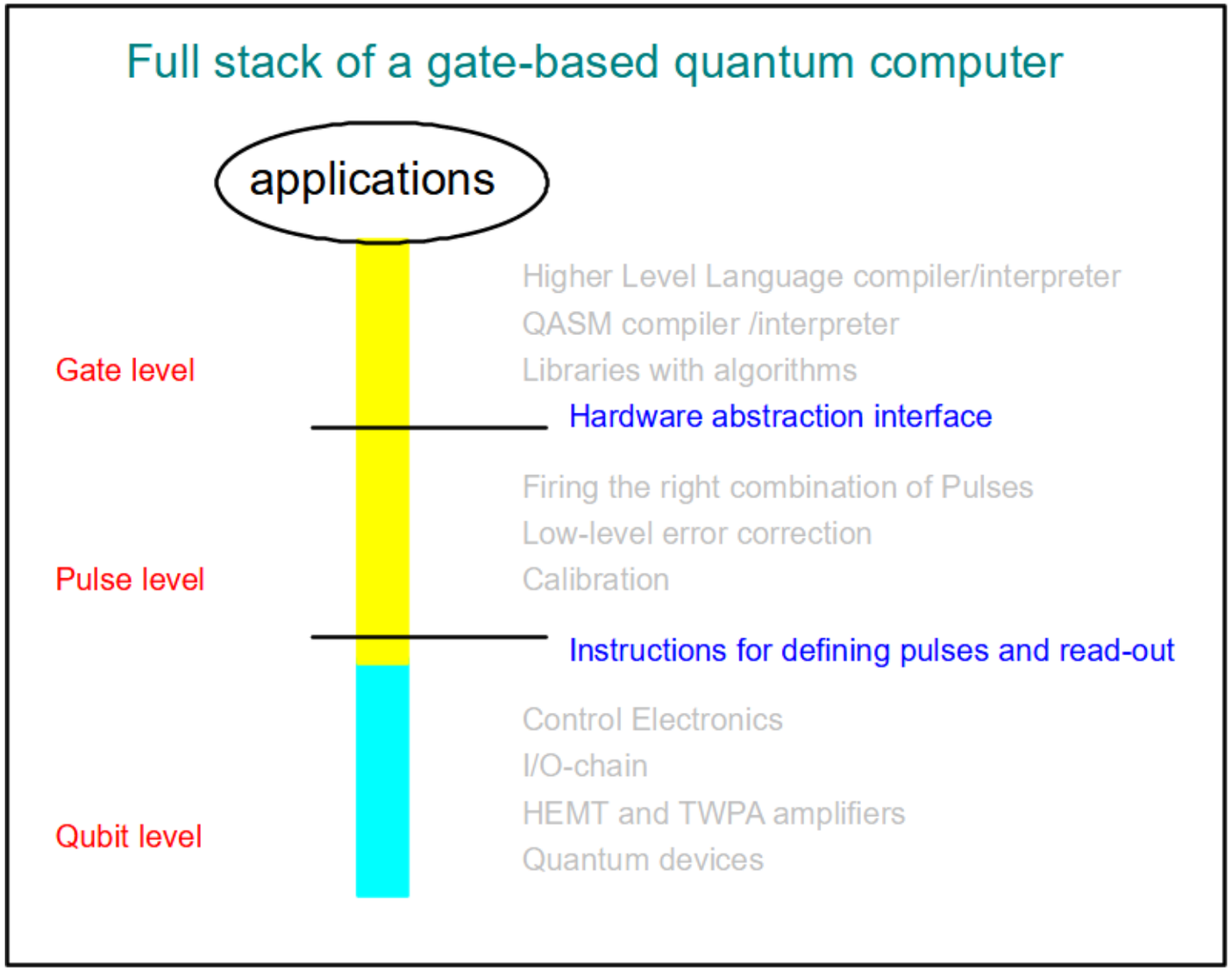

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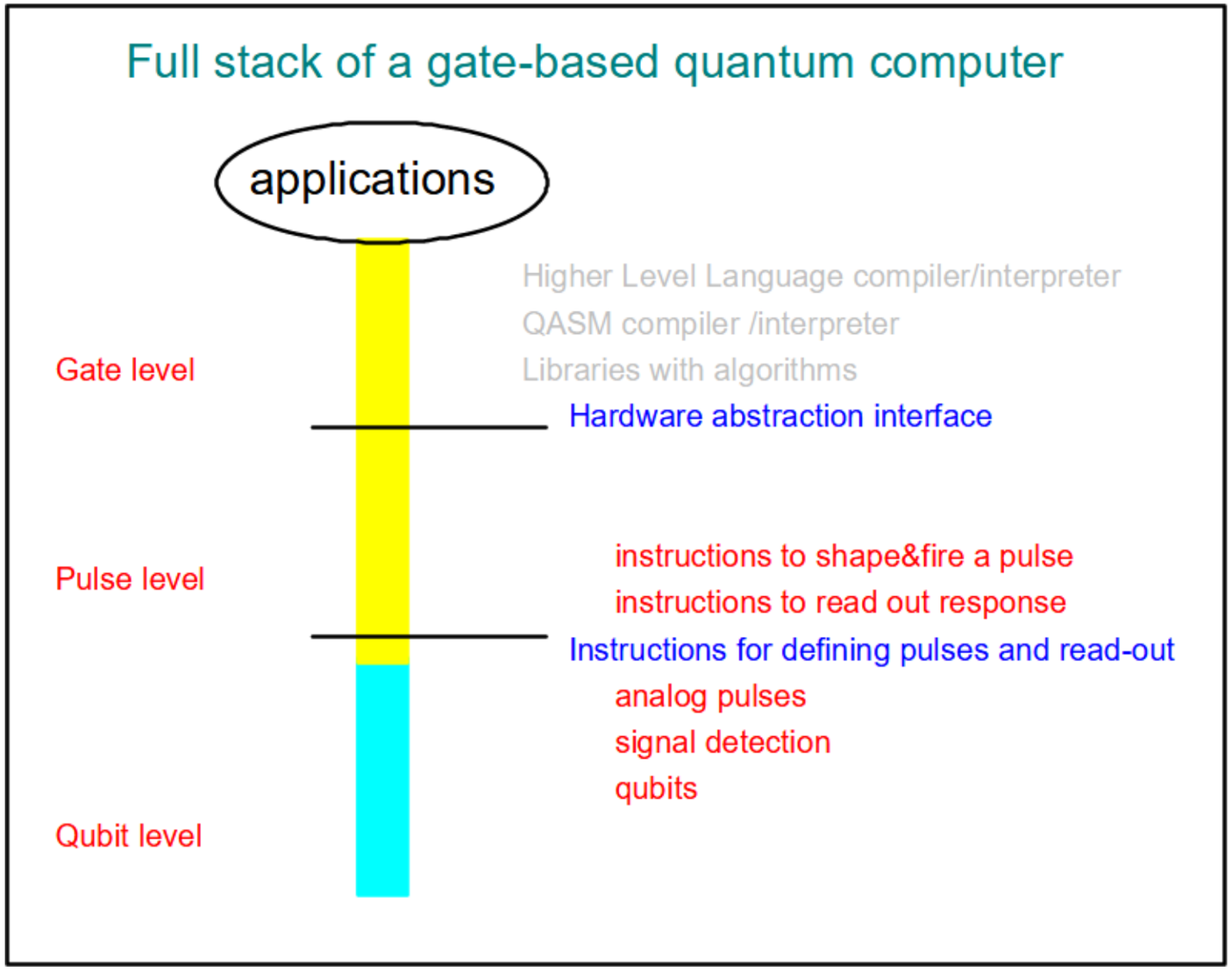

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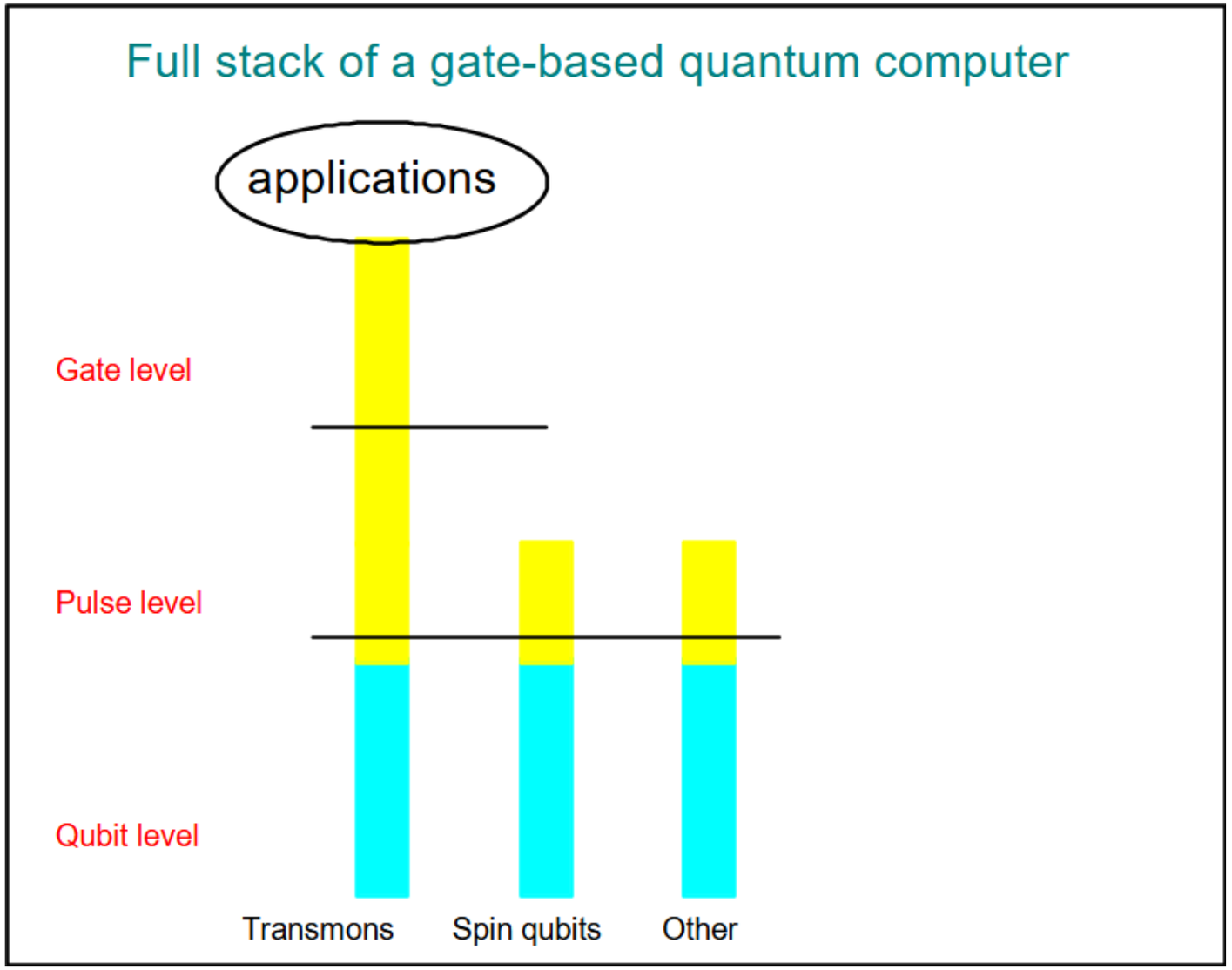

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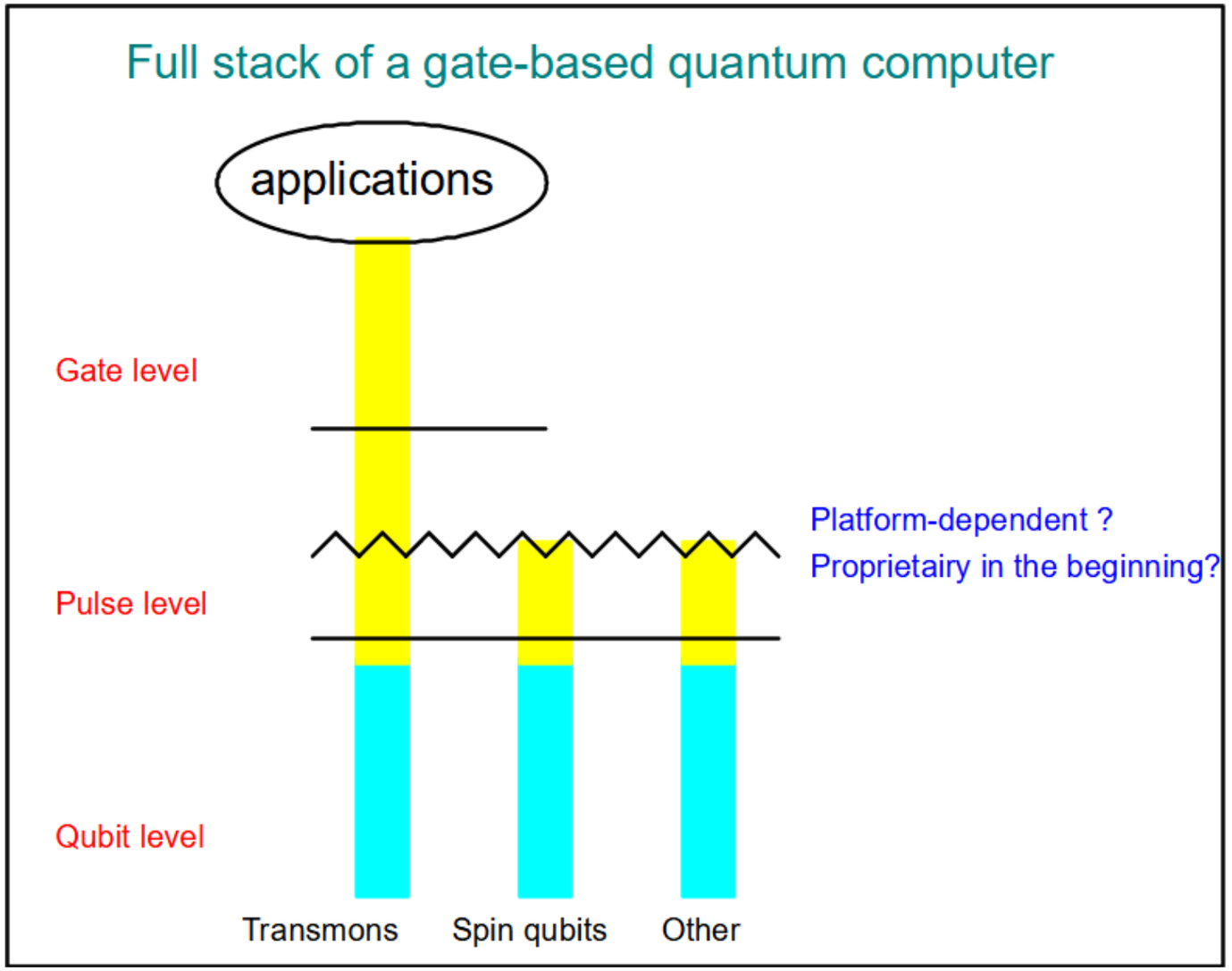

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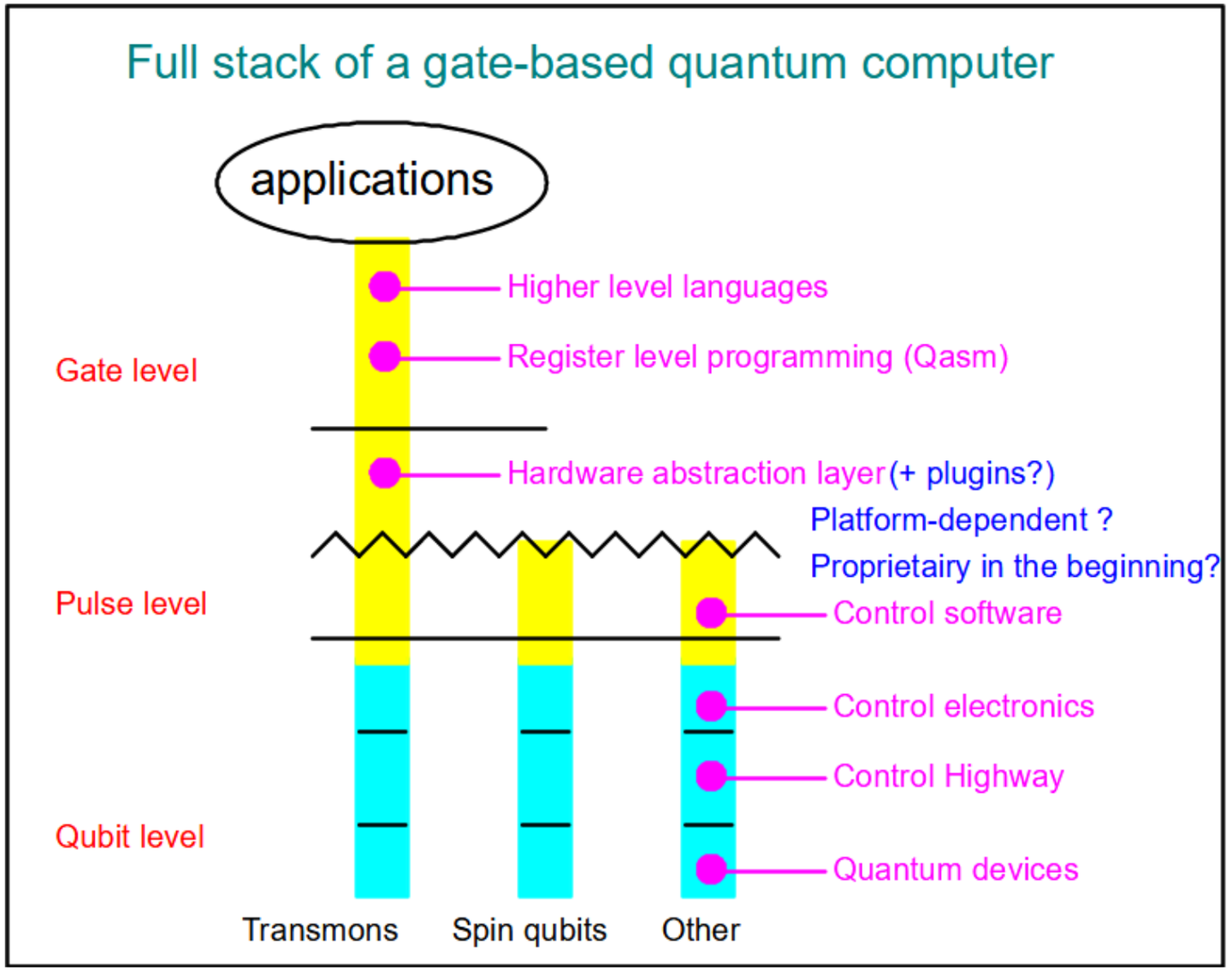

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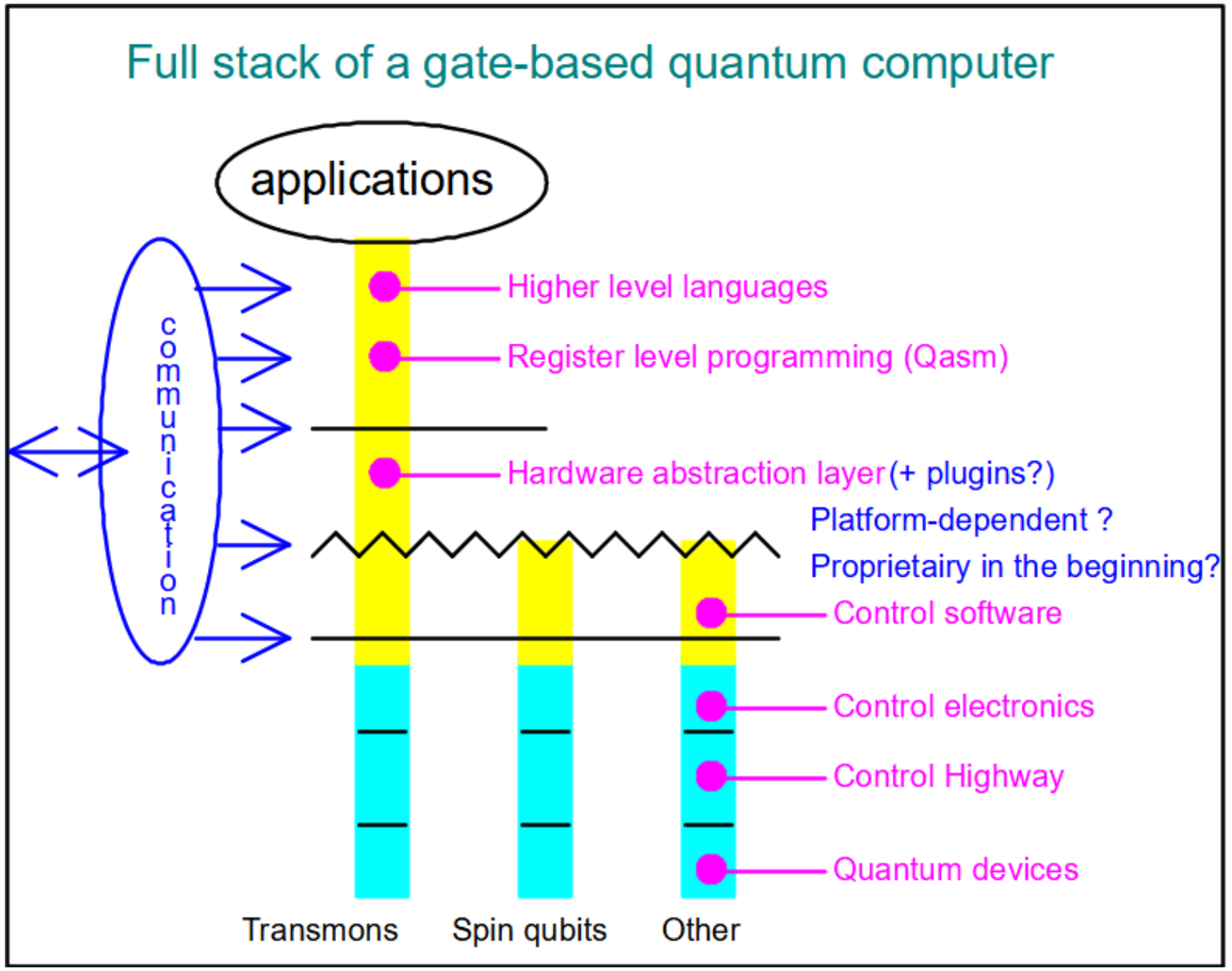

Considerations / discussion

If no consensus on modularity as goal

→ No real need for layer model

→ Mainly monolithic solutions + vendor lock-in

→ Limited value for standardisation

If no consensus on at least those three interfaces

→ Modularity not feasible

If no consensus on functionality of individual modules

→ Modularity not feasible