-EN_52: Machine V — quantum principles in conventional circuits

Electronics and programming from Einstein-VED / UNIHOLOG

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Project access: dossier in DEMUESTRA · base document · plates · translators and compilers · complete resource index.

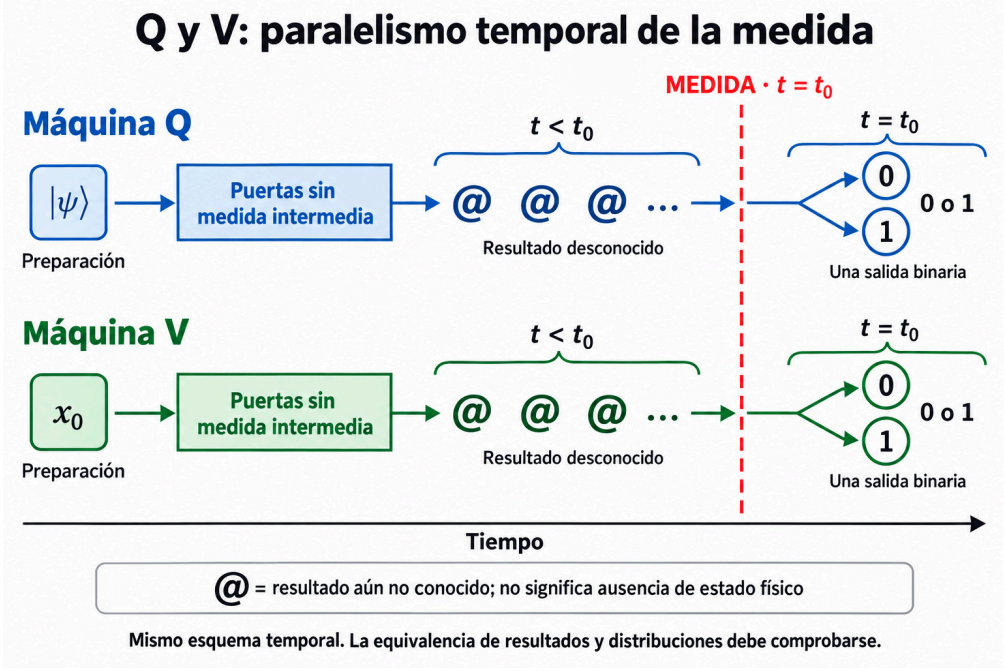


Figure 1. The V construction preserves the lack of knowledge of unfixed states until measurement at t_0. The plate uses @ to express the lack of knowledge that the document represents with ξ.

The contribution of this work

This work develops a construction for **using quantum principles in conventional electronic circuits and in programming**. Machine V incorporates measurement and the temporal dimension into its operation: unfixed states remain unknown until measurement at $t = t_0$.

The contribution is not limited to comparing two machines. I present a construction criterion: **operate on relations without prior knowledge of the individual states and trigger their readout through measurement**. Starting from a known machine Q, the project develops its corresponding V construction, its gates and its programs, and establishes how to compare the two using the same problems and protocols.

Preserving the lack of knowledge until measurement

The central condition of my machine V is that **unfixed states must not be known before measurement at t_0**. It is not enough to hide an answer from the reader while the program already knows it: the construction must respect that prior lack of knowledge, without bringing the readout forward or fixing in advance the results to be measured.

In V, I call the preservation of this condition until measurement **coherence of the construction**. The parallel I propose with Q rests on keeping unfixed results unknown during operations and obtaining them upon measurement. Knowing a relation between inputs and outputs is not equivalent to knowing their individual values.

The architecture may be electronic or programmed; the requirement remains: **if advance knowledge of these states is introduced, the machine V defined here has been changed**.

Not knowing the value does not prevent operation

In this work, **ξ represents lack of knowledge**, not an additional logical value or a physical word that the machine must store. We can be unaware of the individual values and know, construct and transform their relations. For an inverter:

$$B = 1 - A, \qquad K(A) = \xi, \qquad K(B) = \xi\,.$$

The relation is defined even though we have read neither A nor B. Upon measurement, performed at a specific instant, we obtain a recorded result:

$$t = t_0\,, \qquad M_V(t_0) = (v_0\,, \ldots, v_{n-1}), \qquad v_i \in \{0, 1\}\,.$$

The measurement instant is not a label added to a previously calculated answer: **it triggers the readout**. A repeated query returns that same readout; it does not manufacture a new attempt. The controller must not introduce an exponential register of amplitudes or iterate through possible answers during triggering.

Uncertainty in Einstein-VED / UNIHOLOG

In my **Einstein-VED / UNIHOLOG** framework, indeterminism and probabilities are explained through the lack of knowledge of unfixed states. Before measurement we speak of possibilities; upon measurement at $t = t_0$, the result of that measurement becomes defined and recorded, and is no longer a pending possibility.

This interpretation links uncertainty to an **internal property of spacetime**, expressed through $f(t)$, and to the temporal point from which we can know the facts. The position at t_0 distinguishes what is known from what is not yet fixed for that readout. Not knowing a state does not assert its nonexistence; the past and the future do not disappear because of our position on the timeline either.

This is the idea I bring to the V construction: preserve the lack of knowledge of unfixed states and have measurement at t_0 produce the defined readout. The temporal dimension and measurement are part of the machine, both in conventional electronics and in programming.

From a known machine Q to a V construction

The project brings together the base document, the Q1–V1, Q2–V2 and Q3–V3 plates and the gate constructions. It adds a working approach: take a circuit described in **OpenQASM 2.0** and produce a V plan and controllers in **Python, Prolog and C++**.

The translator preserves operations, controls, connections and order. The interface separates preparation and triggering; it requires a connected realization to obtain a readout. The included example allows

inspection of the translation of H and CNOT; the instructions explain which tools and which realization each execution needs.

The guide, launchers and generated programs are linked in the resource index. The relative structure allows the entire project to be moved without losing the links between its documents.

How I propose to compare Q and V

Q and V must be subjected to the same observable protocol: preparations, inputs, operations, measurement settings, operating conditions and readout instants. If internal values in Q are not observed during computation, such readouts must not be demanded of V as a condition for comparing them either.

Each execution produces a readout. To study distributions, we repeat independent preparations and record the results. The comparison maintains the same access to information in both machines.

Temporal order will be studied by separating **preparation, evolution, triggering and readout**, and declaring the resources used. The reports and programs allow the corresponding times in both machines to be documented.

Documentation, programs and checks

DEMUESTRA centralizes the documents, programs, reports and their publication. The project page allows readers to browse the evaluations and access their data. The complete resource index links each item so that readers can consult its content and results directly.

The invitation is concrete: **build, run, record and compare**. Particularly useful are realizations of the gates and their readout, interference and correlation protocols, and comparisons of results, resources and times. An agreement, a discrepancy or an experimental limit must be documented with the circuit, preparation, measurement and data that allow it to be reproduced.

DOI archive and project navigation

The general **Einstein-VED / UNIHOLOG** archive has a version DOI 10.5281/zenodo.23284583 and a concept DOI 10.5281/zenodo.17172925. The former identifies an archived version; the latter groups the versions of the record. These DOIs correspond to the archive of the general framework; the article and its supplements are presented in DEMUESTRA project 52.

To read and browse the material without downloading the complete archive, the entry point is project 52 in DEMUESTRA. The linked index brings together documents, programs, plates, reports and supplements; it identifies historical trials separately to avoid confusing them with evaluations of the current construction.

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