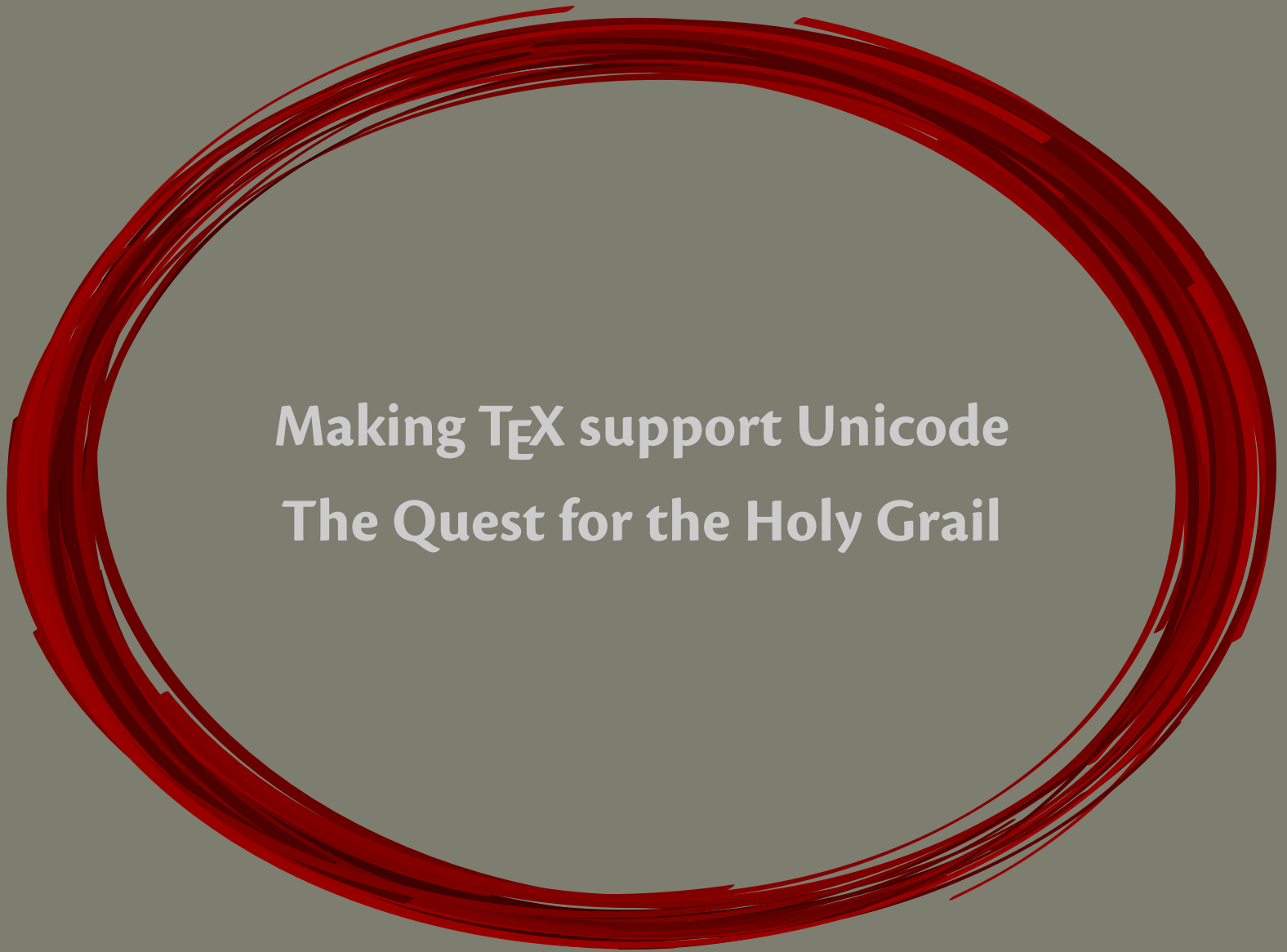
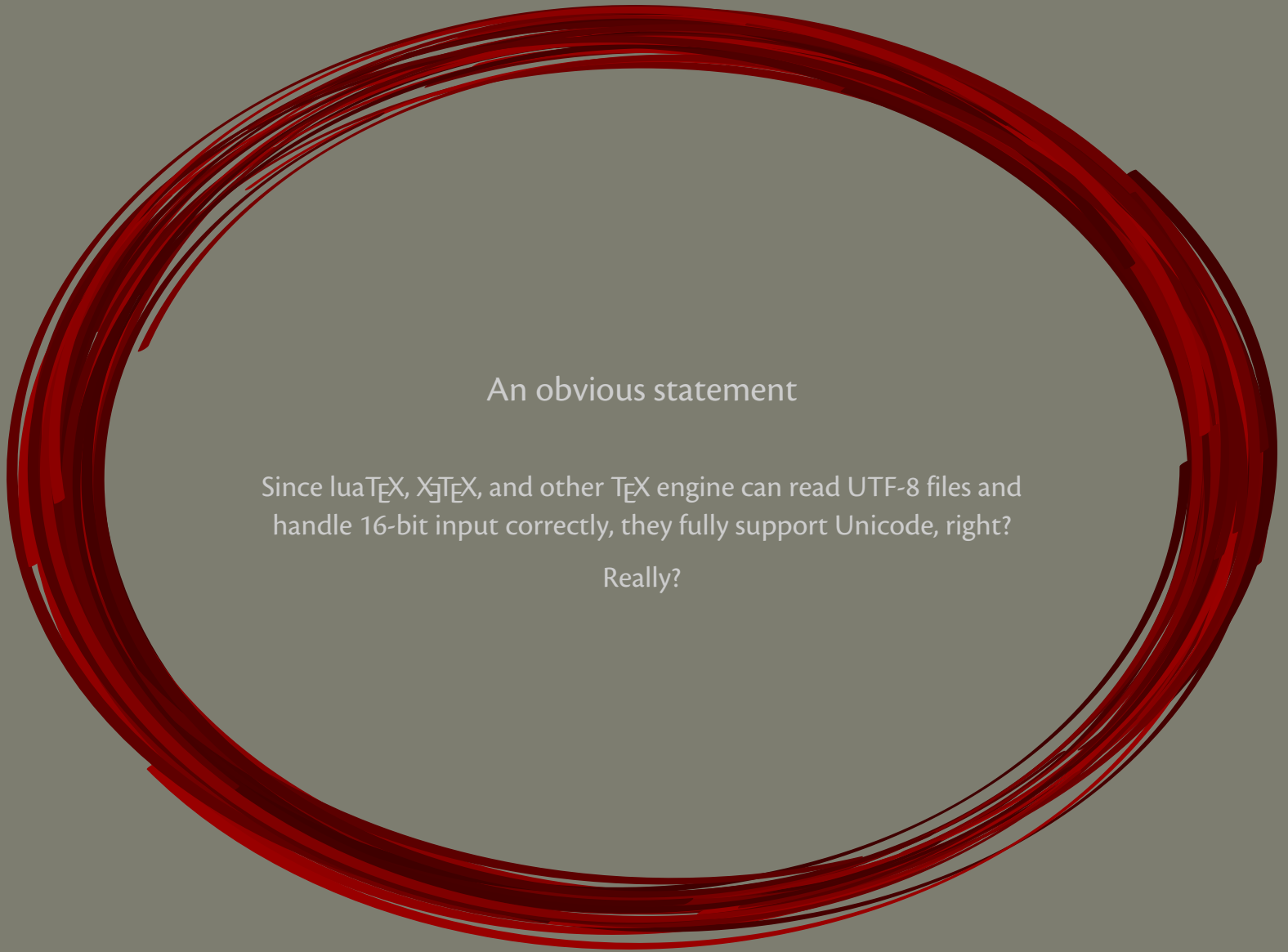


Making TEX support Unicode
The Quest for the Holy Grail

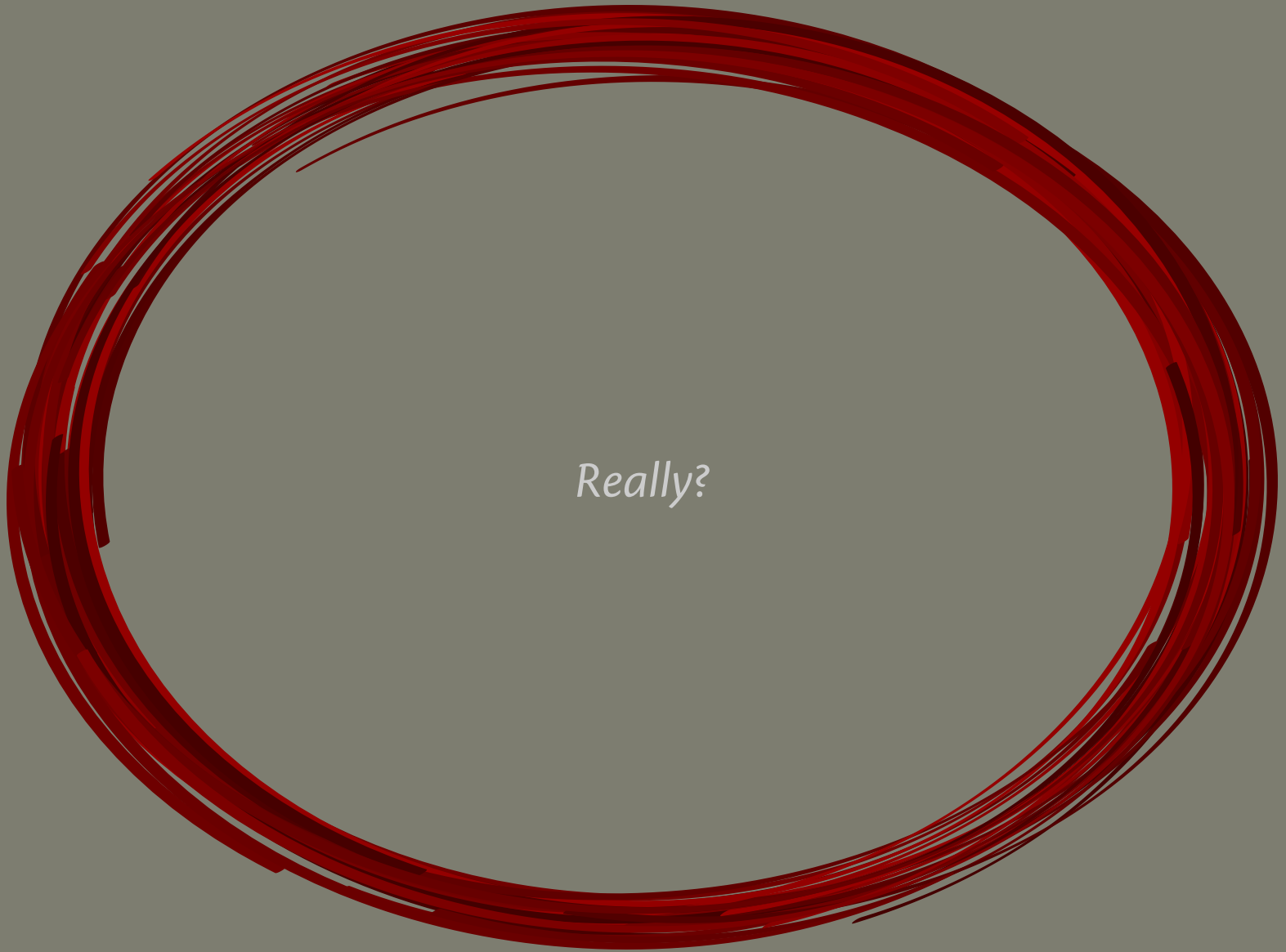
The Holy Grail

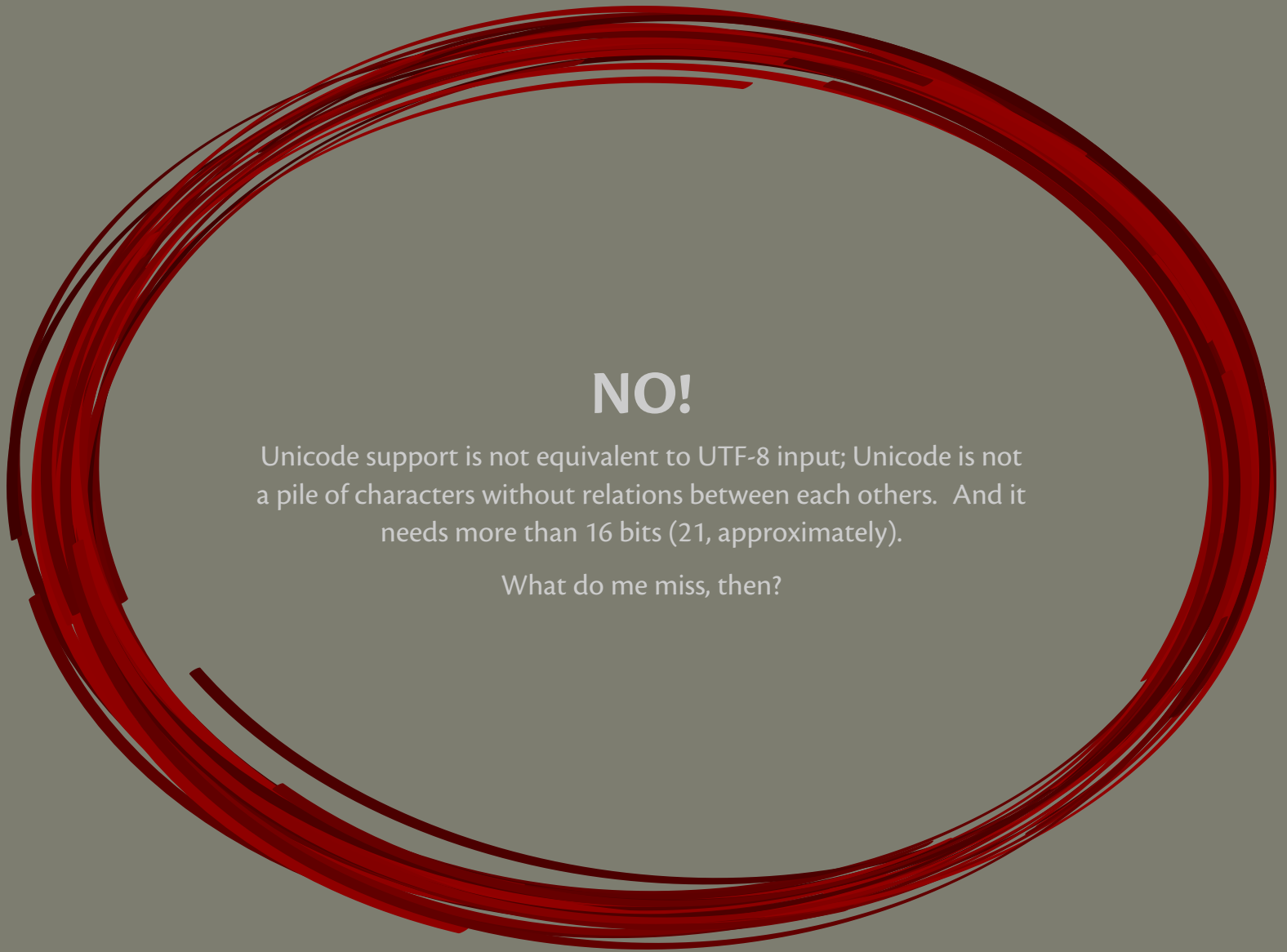


An obvious statement

Since luaTEX, XETEX, and other TEX engine can read UTF-8 files and handle 16-bit input correctly, they fully support Unicode, right?

Really?

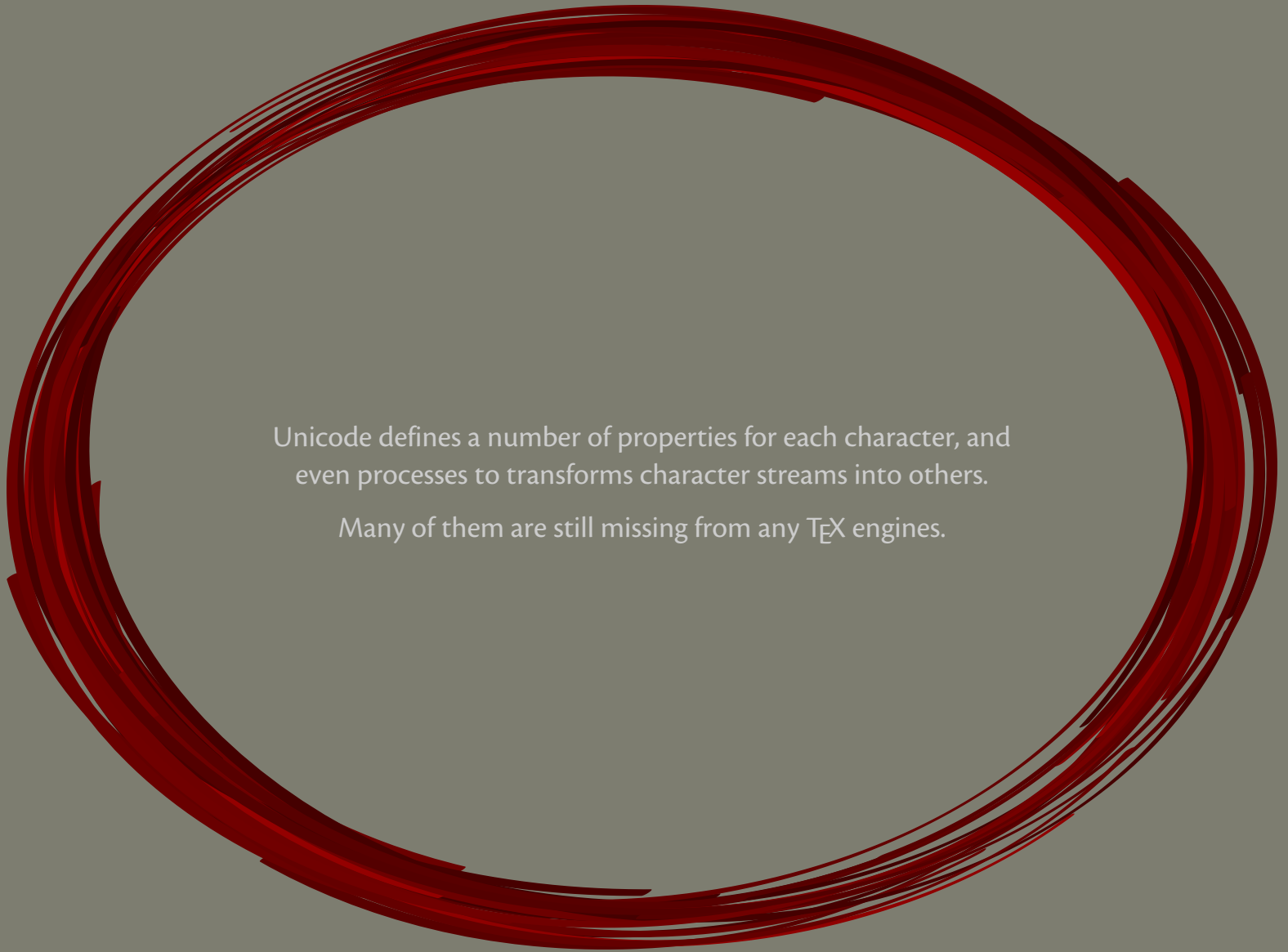

Really?



NO!

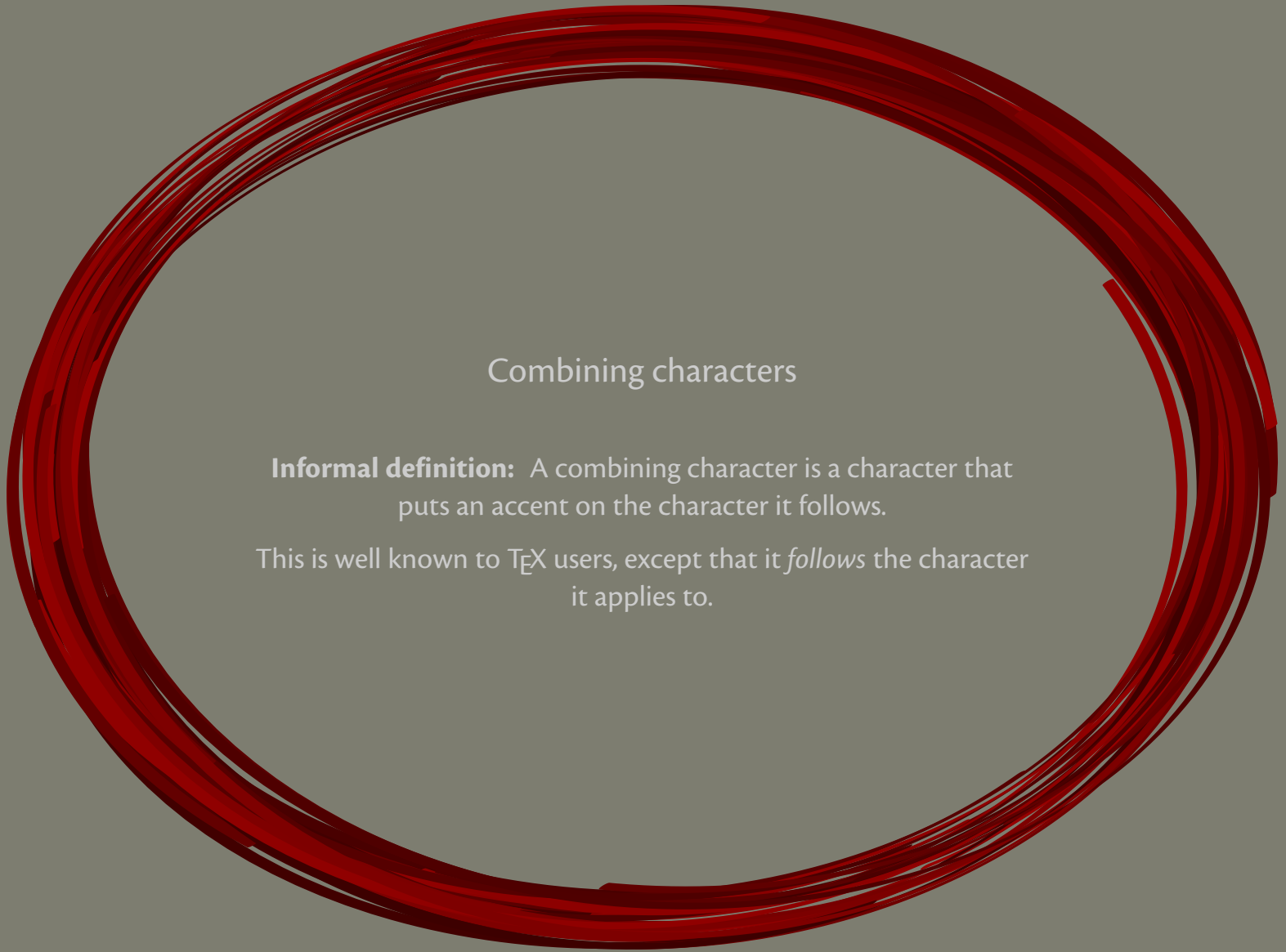
Unicode support is not equivalent to UTF-8 input; Unicode is not a pile of characters without relations between each others. And it needs more than 16 bits (21, approximately).

What do me miss, then?



Unicode defines a number of properties for each character, and even processes to transforms character streams into others.

Many of them are still missing from any TEX engines.

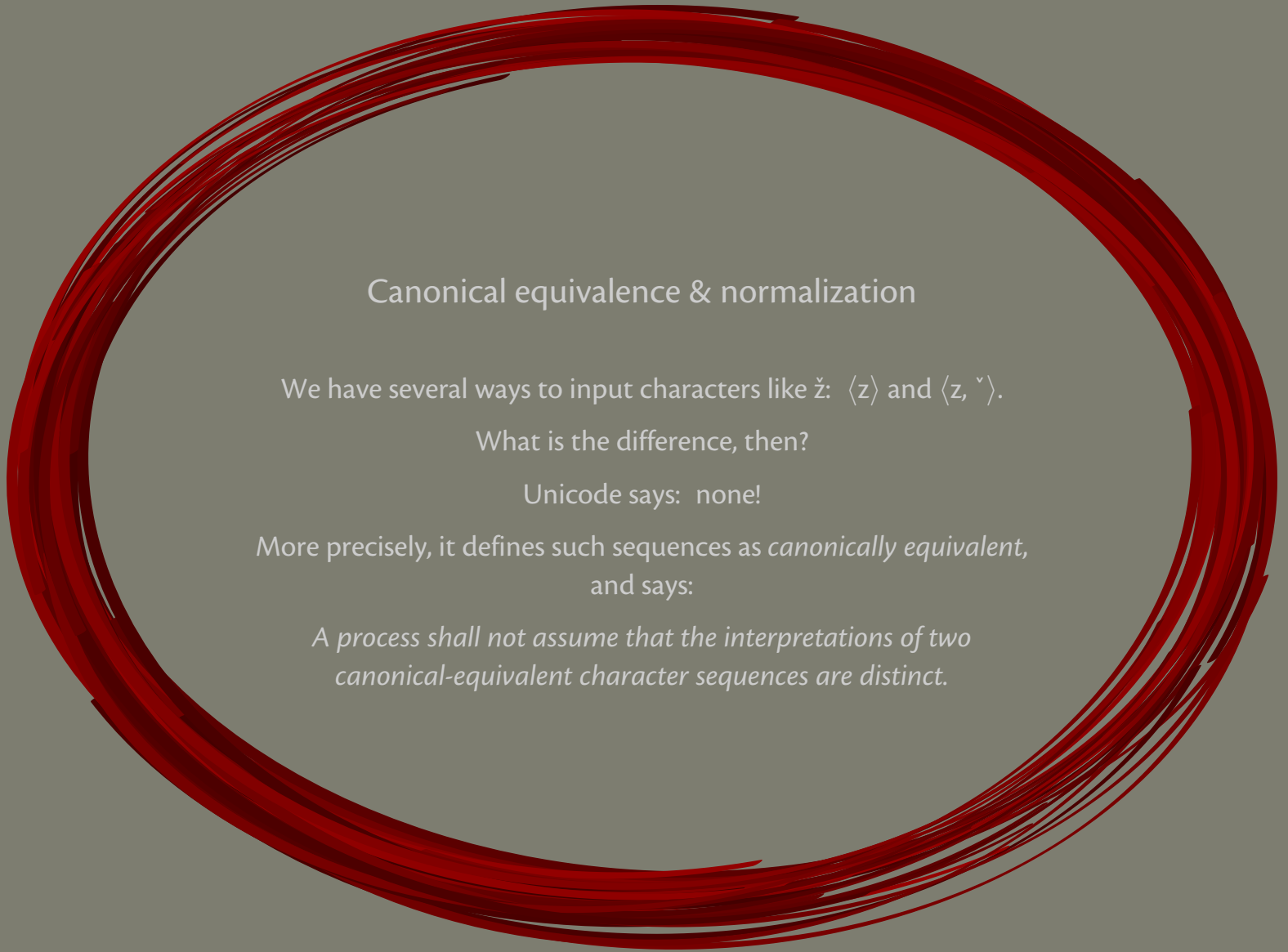


Combining characters

Informal definition: A combining character is a character that puts an accent on the character it follows.

This is well known to TEX users, except that it *follows* the character it applies to.


Combining demo



Canonical equivalence & normalization

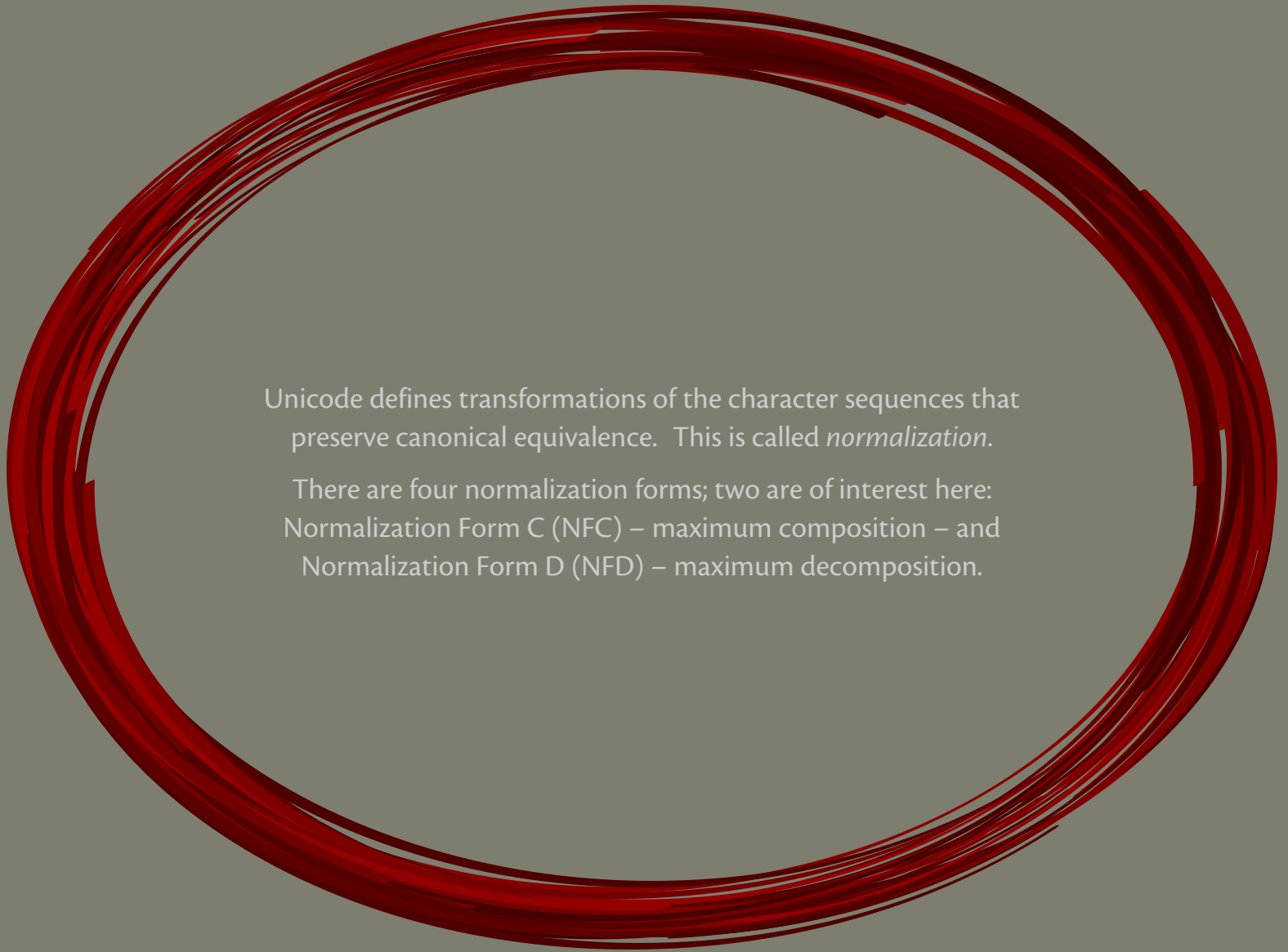
We have several ways to input characters like ž: ⟨z⟩ and ⟨z, ˇ⟩.

What is the difference, then?

Unicode says: none!

More precisely, it defines such sequences as *canonically equivalent*, and says:

A process shall not assume that the interpretations of two canonical-equivalent character sequences are distinct.

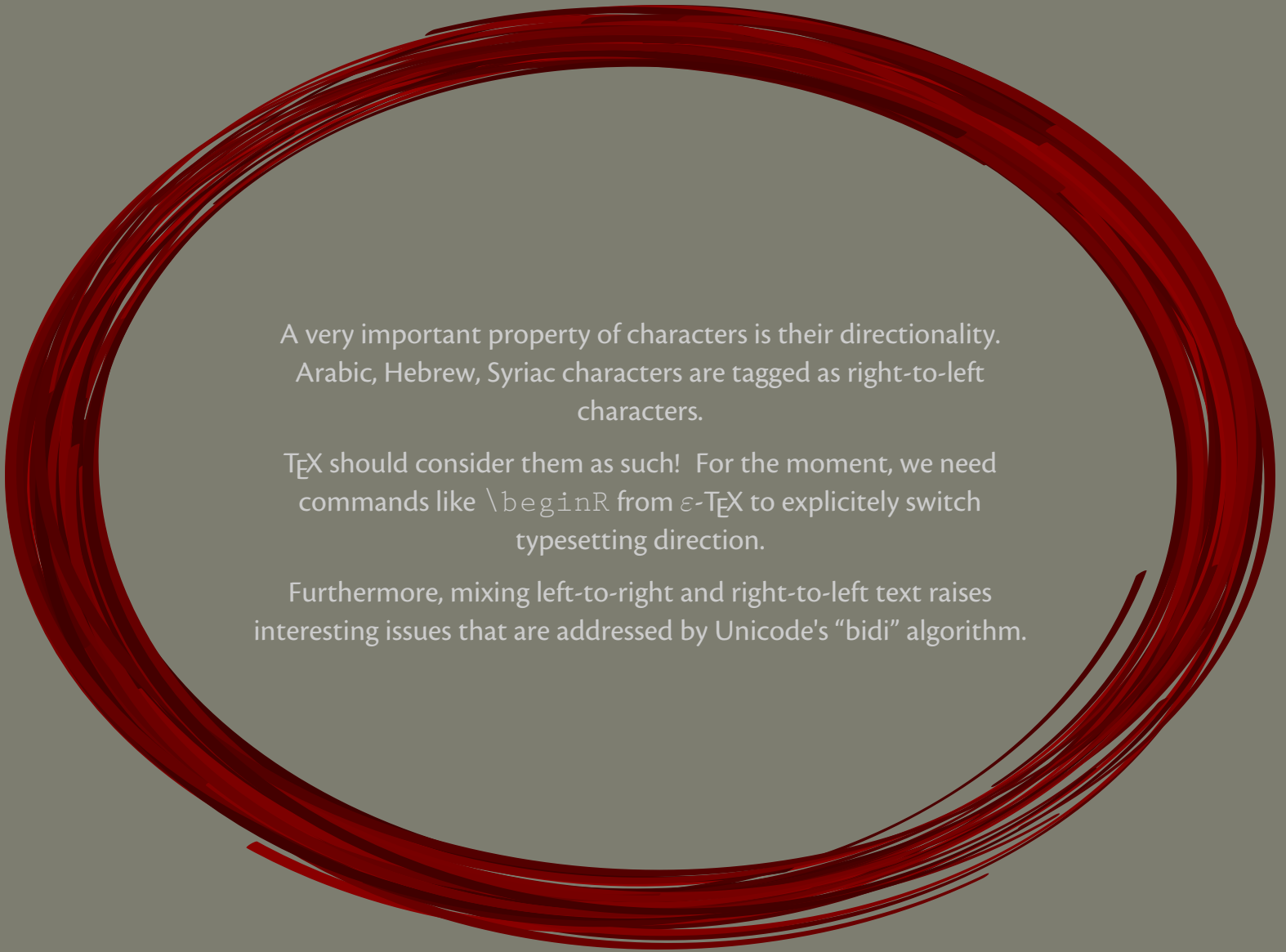


Unicode defines transformations of the character sequences that preserve canonical equivalence. This is called *normalization*.

There are four normalization forms; two are of interest here: Normalization Form C (NFC) – maximum composition – and Normalization Form D (NFD) – maximum decomposition.


Normalization demo

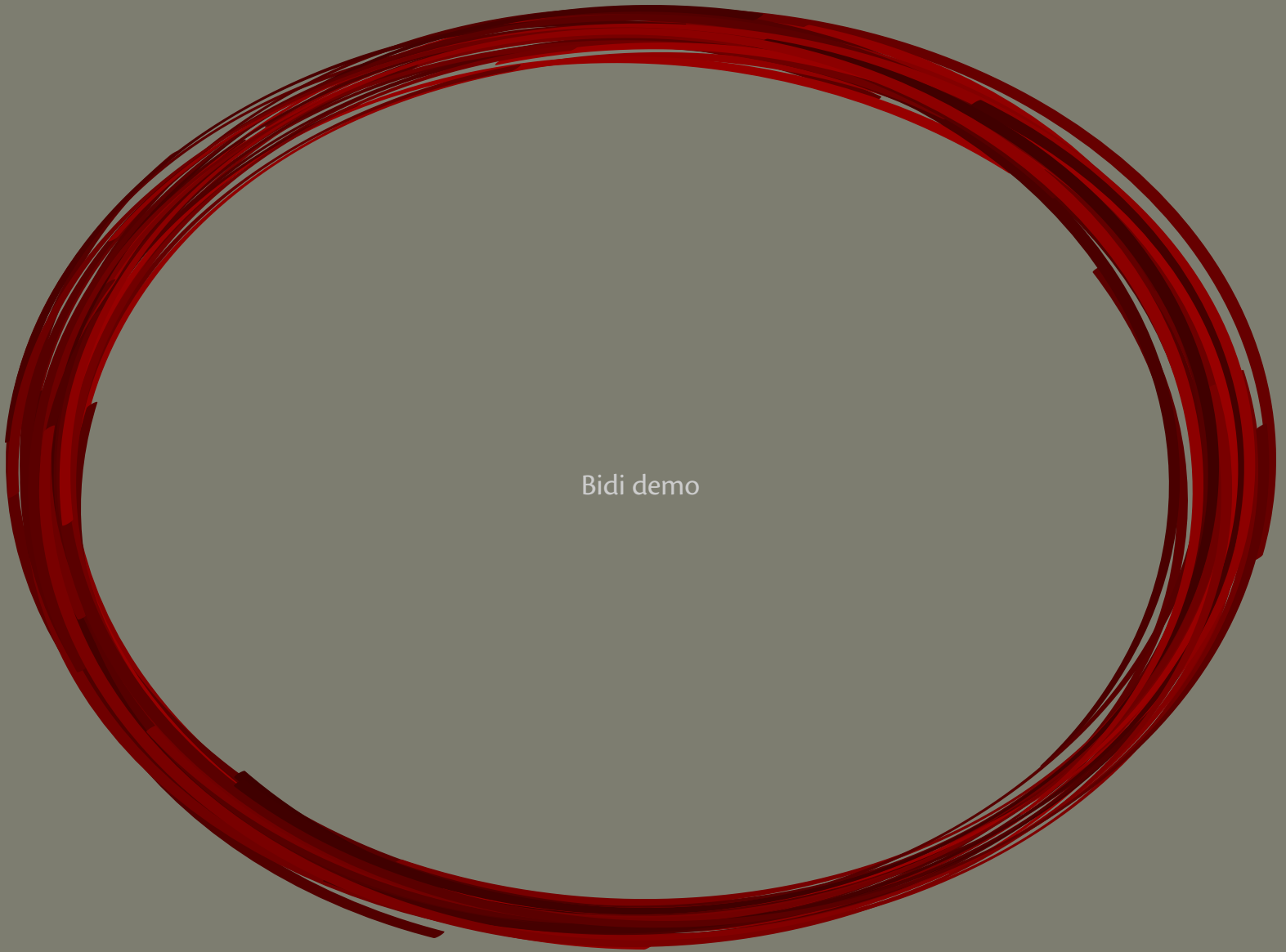
Trivia: Normalization is especially relevant for “European” alphabetic scripts … and for Korean.



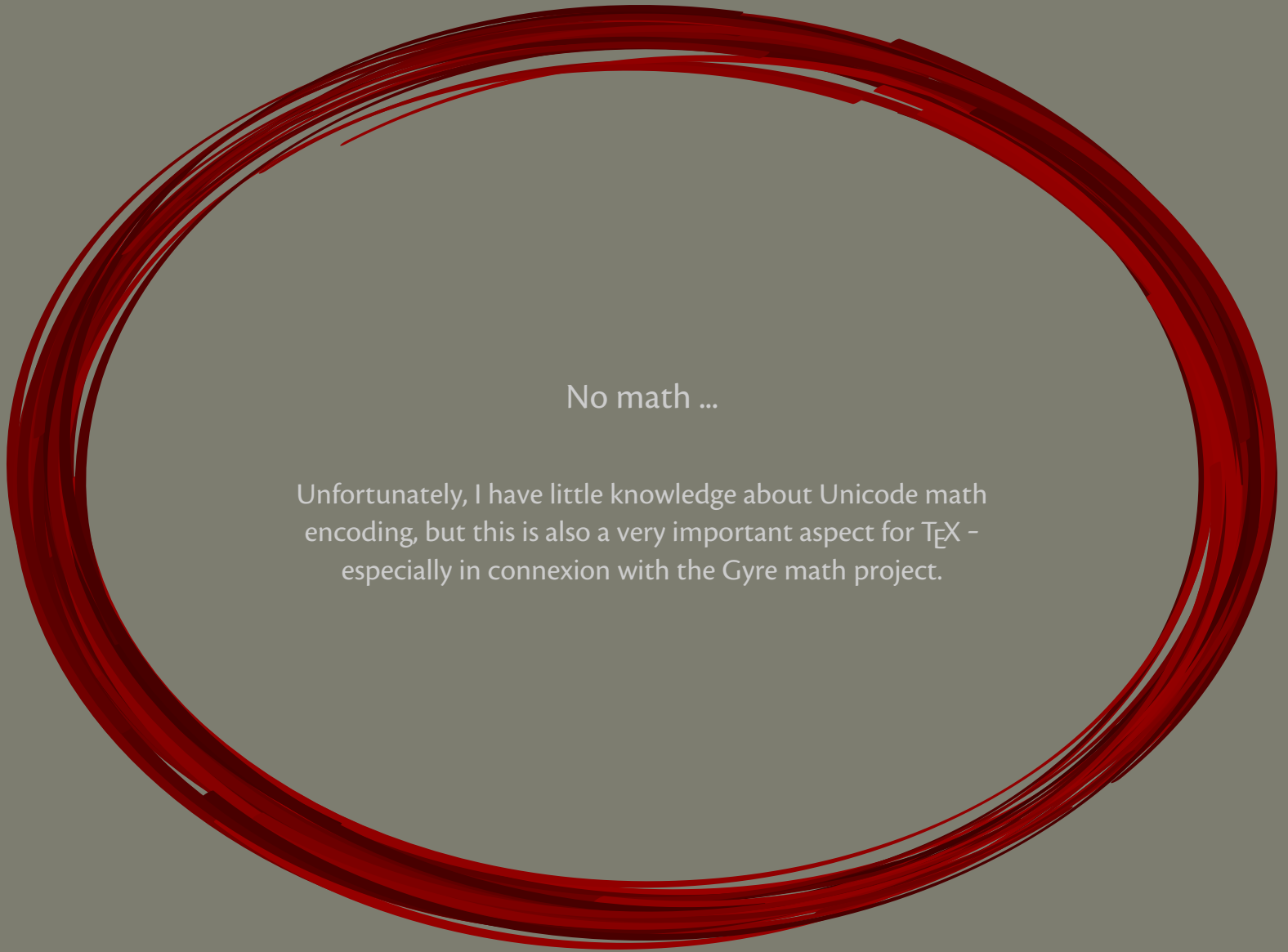
A very important property of characters is their directionality. Arabic, Hebrew, Syriac characters are tagged as right-to-left characters.

TEX should consider them as such! For the moment, we need commands like `\beginR` from ε-TEX to explicitely switch typesetting direction.

Furthermore, mixing left-to-right and right-to-left text raises interesting issues that are addressed by Unicode's "bidi" algorithm.


Bidi demo

Unicode also contains all sort of characters with special properties:
unbreakable space, zero-width-non-joiner, soft hyphen, etc.



No math ...

Unfortunately, I have little knowledge about Unicode math encoding, but this is also a very important aspect for TEX – especially in connexion with the Gyre math project.

An imperfect Grail

Thank you, Jacko!