



NOVAR AI·LENS

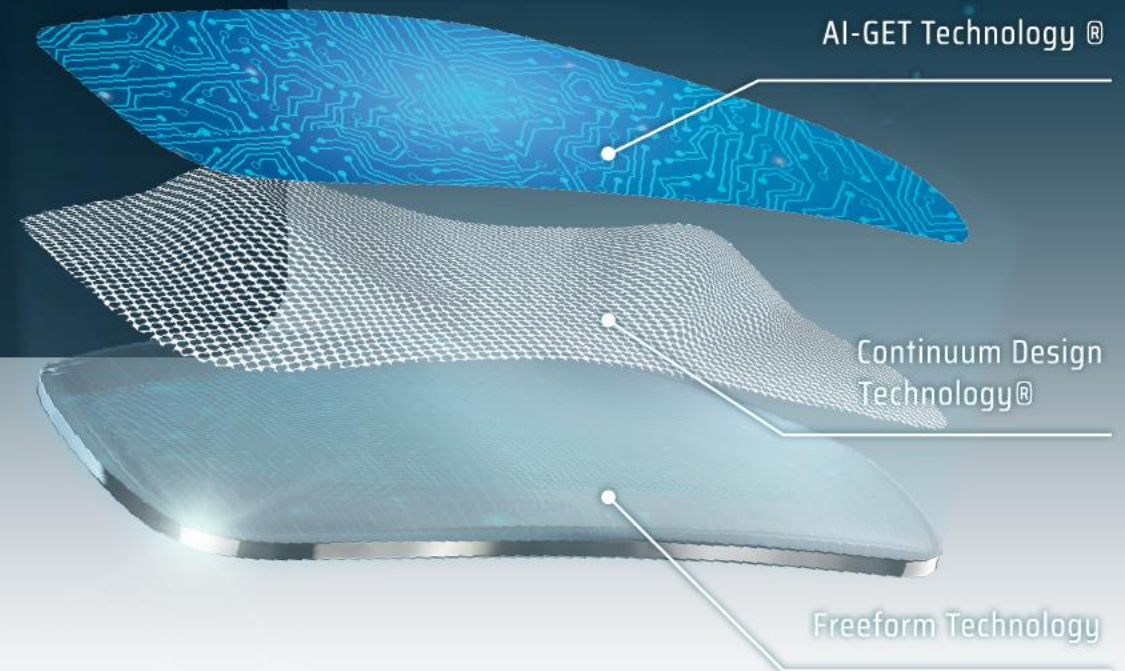
Designed by **Artificial Intelligence**

What is **NOVAR AI•LENS** ?



First lens ever designed by
Artificial Intelligence

Novar AiLens© is the result of the latest and most recent global technological innovation to achieve results beyond what has been known so far, optimizing the lens so you can see the world without peripheral limits.



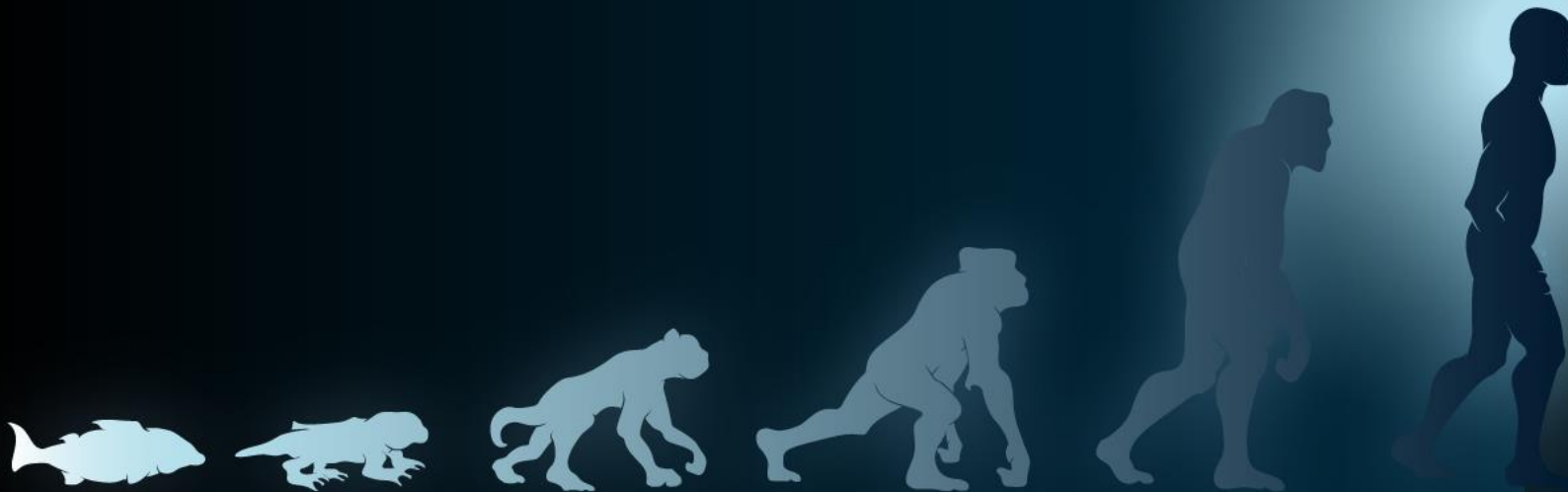
OPHTHALMIC LENS DESIGNED WITH **ARTIFICIAL INTELLIGENCE (AI)**

Gabriel Martin - *Physical Sciences*

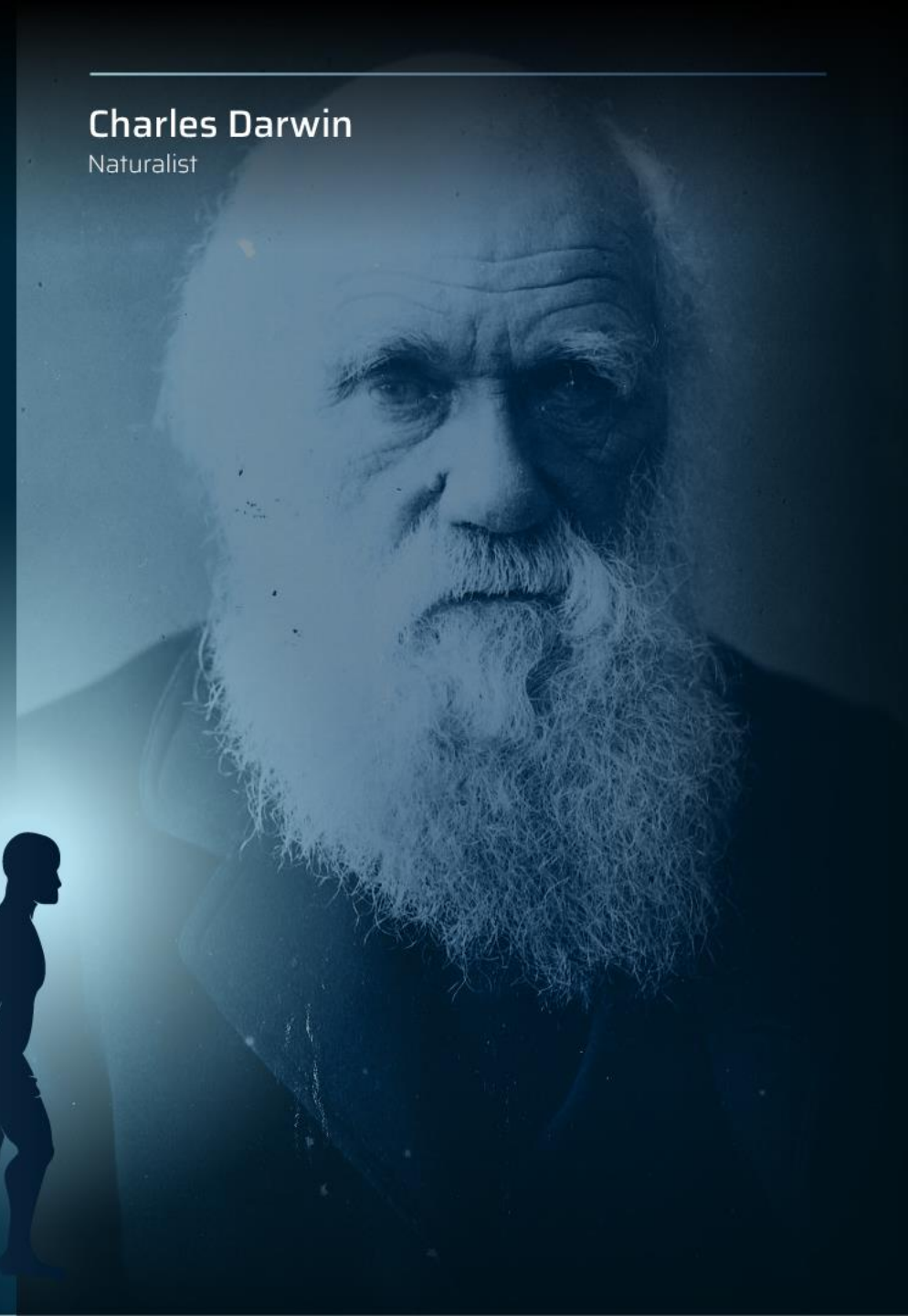
Gervasio Pérez - *Computer Sciences*

Biological evolution is the set of changes in phenotypic and genetic characters of biological populations through generations. These changes occur due to the processes of crossover and mutation.

Biological evolution - Phenotypical - Genetic - Crossover - Mutation



Charles Darwin
Naturalist





What does all this have to do with
a **progressive addition lens**?

Natural evolution: design the individual best adapted to a given environment.

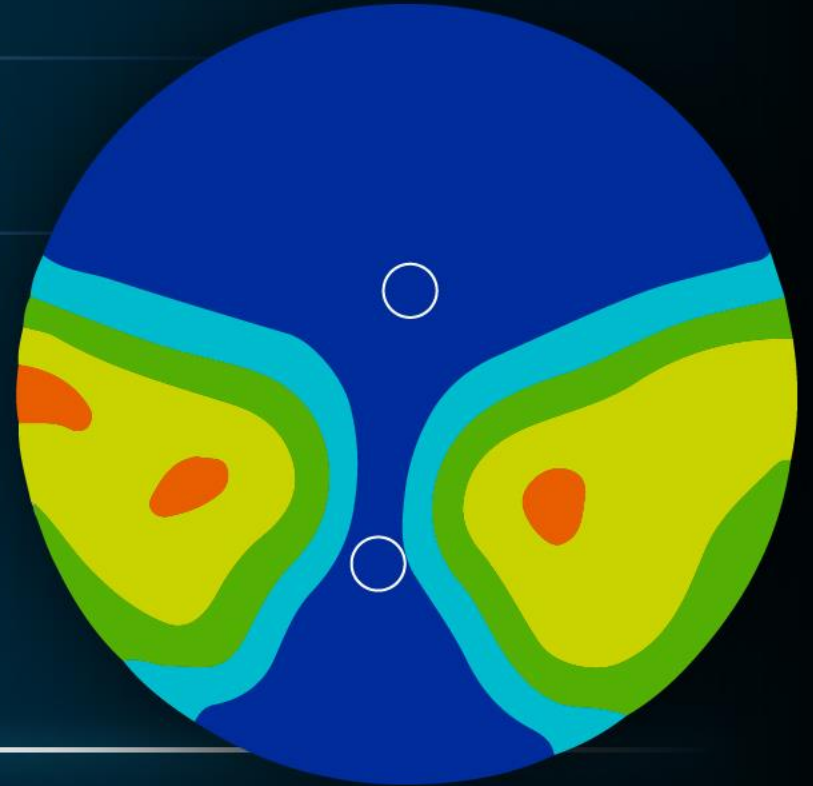
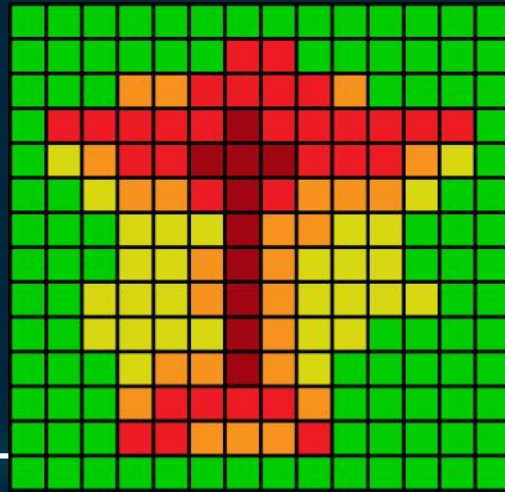
Genetic algorithms: Emulate the biological evolutionary process to solve complex optimization problems.

MAKING HISTORY

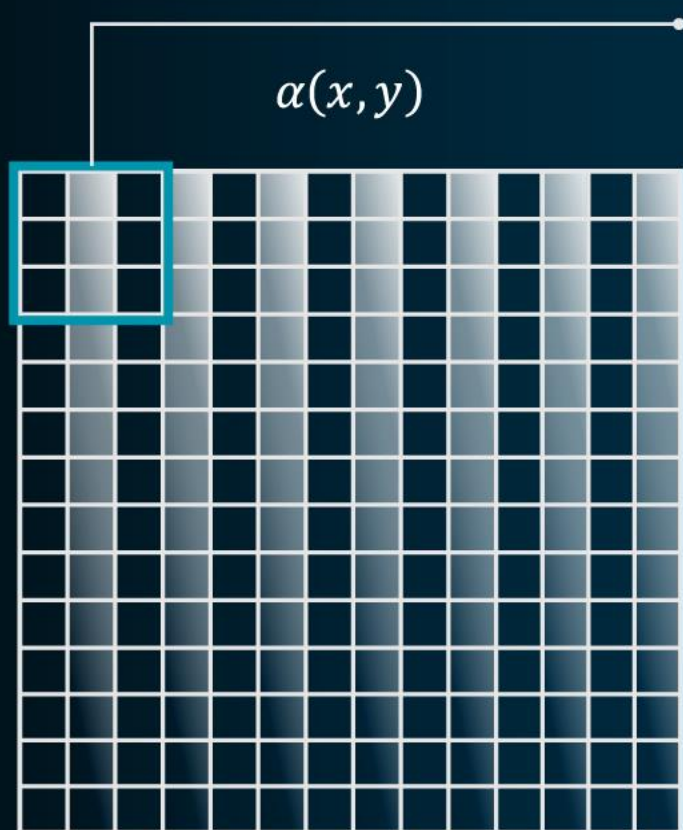
2015

In 2015, Novar introduced to the market an alternative approach to progressive lens design: Continuum Design Technology, or CDT.

$$\varepsilon^2 = \int_{\Omega} dx dy [\alpha(x, y) \Delta P(x, y)^2 + \beta(x, y) \Delta A(x, y)^2]$$



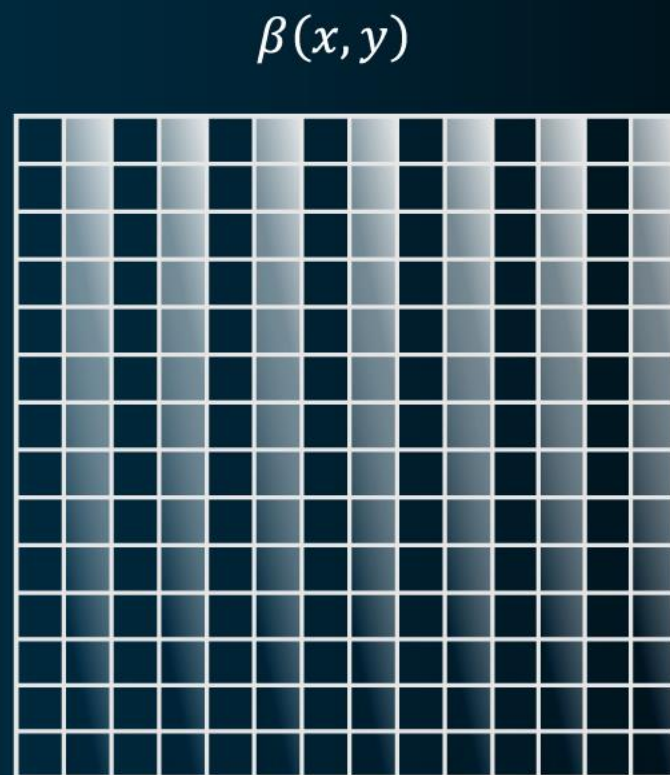
Spherical Power Matrix



12	9	158
22	15	29
11	10	8

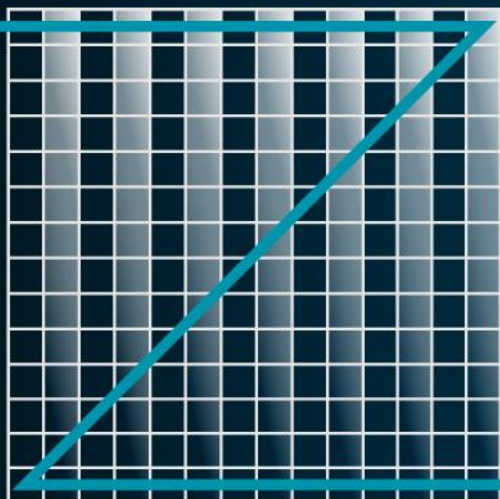
39 x 39 elements each

Astigmatic Power Matrix

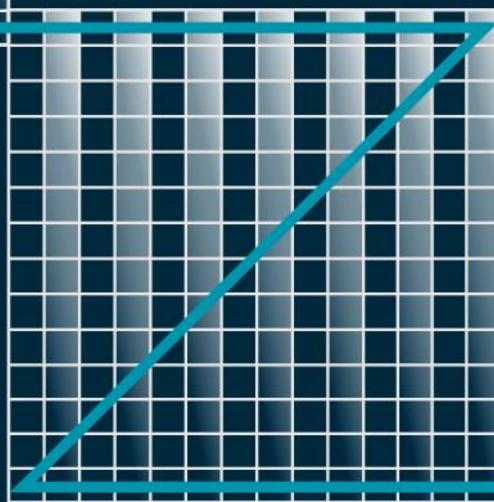


Spherical Power Matrix

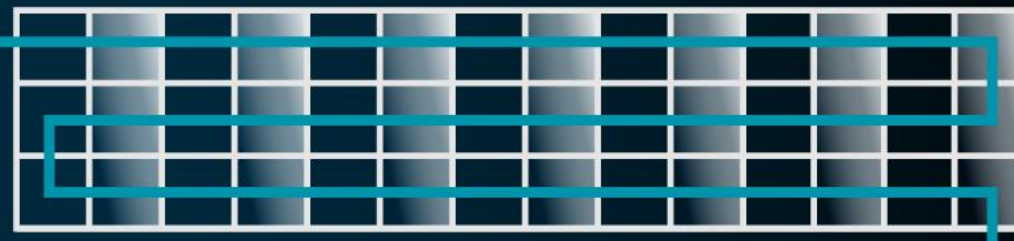
Index= 1



Astigmatic Power Matrix



Index= 3200



Genotype

Genetic information of an individual that defines its biological characteristics.



GEN
(2 bases, either 0 or 1)



GEN
(4 bases, either A, T, C, G)



Phenotype

Set of observable characteristics of an individual that result from the interaction of its genotype with the environment.



2018

In 2018, our R&D team decided to start working with genetic algorithms to optimize relaxation functions in an unsupervised manner, the project name of which has been R2-D2

Genetic algorithms are inspired by the process of natural selection of species.

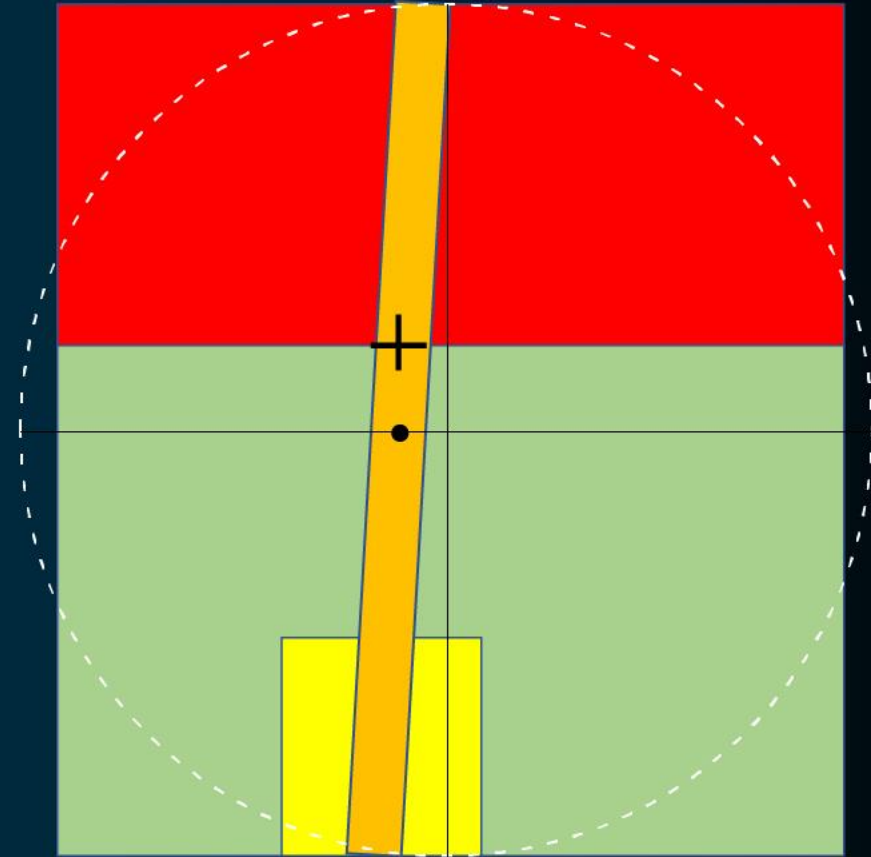


R2-D2 = Arturito

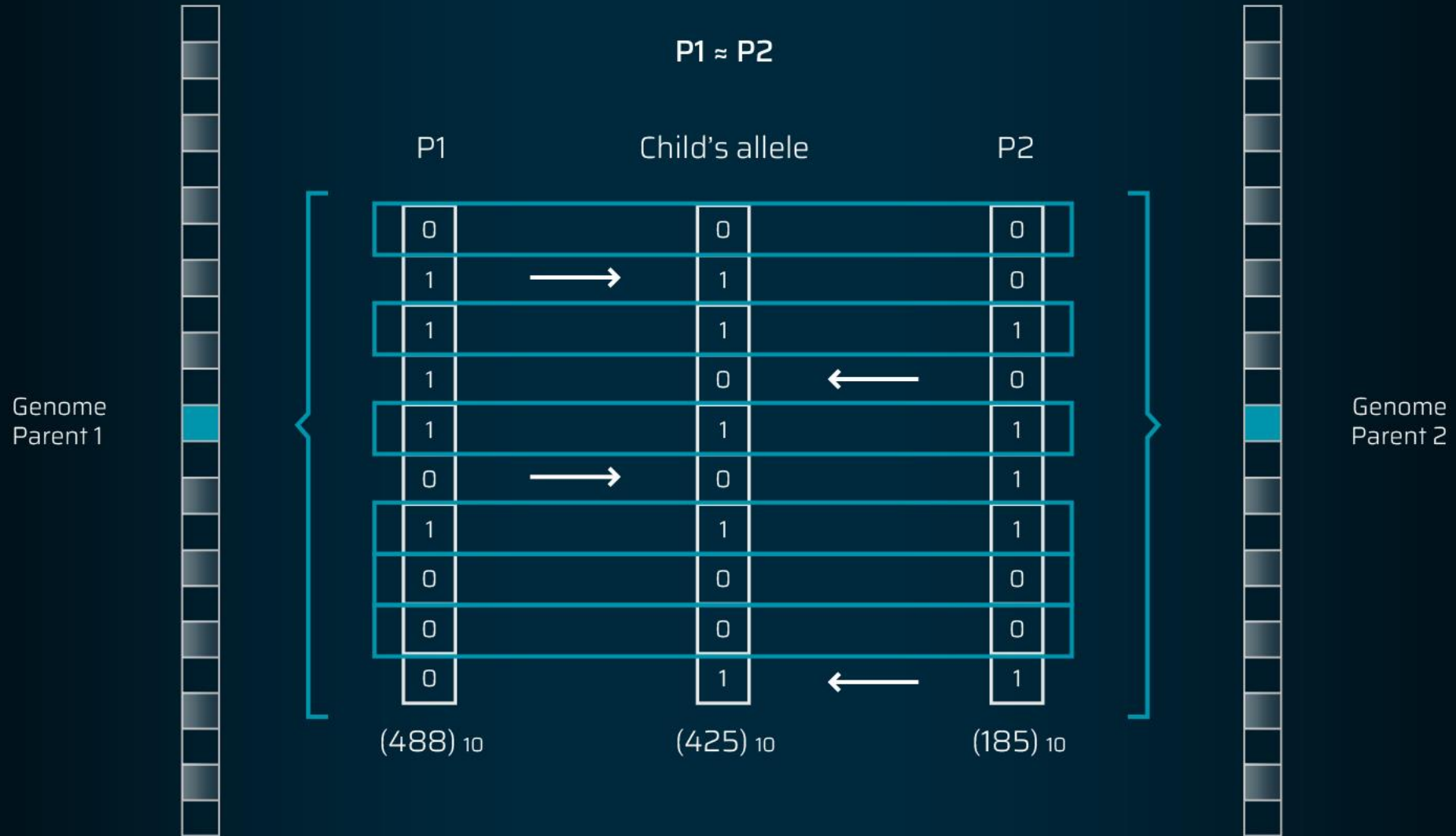
FITNESS FUNCTION

- The Fitness Function establishes an individual's ability to compete with others.
- A Fitness Score is assigned to each individual. The probability of reproduction of this individual will be linked to its score.

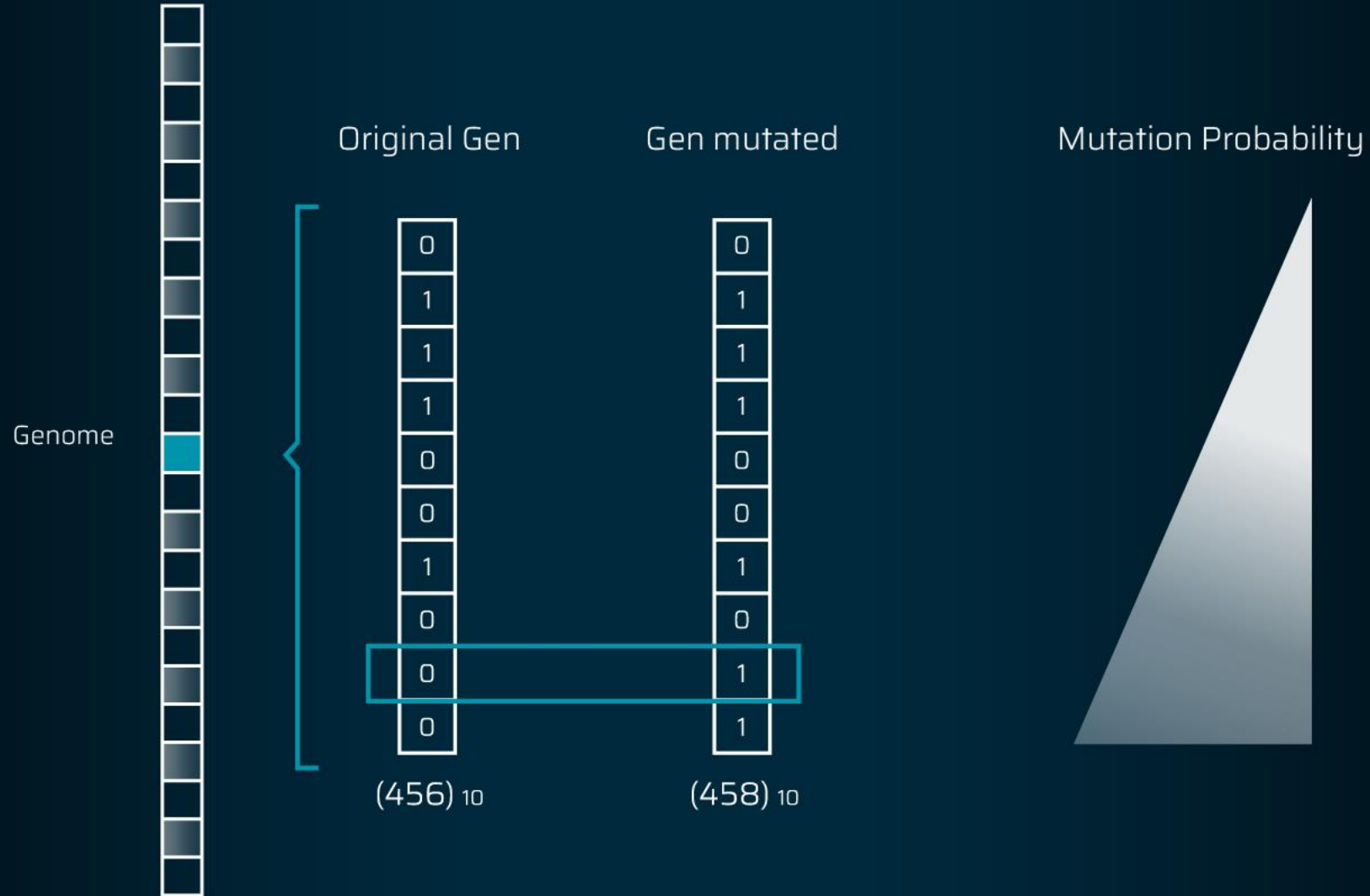
The Fitness Score is calculated by analyzing the different areas of the lens by evaluating the conditions of optical power and astigmatism.

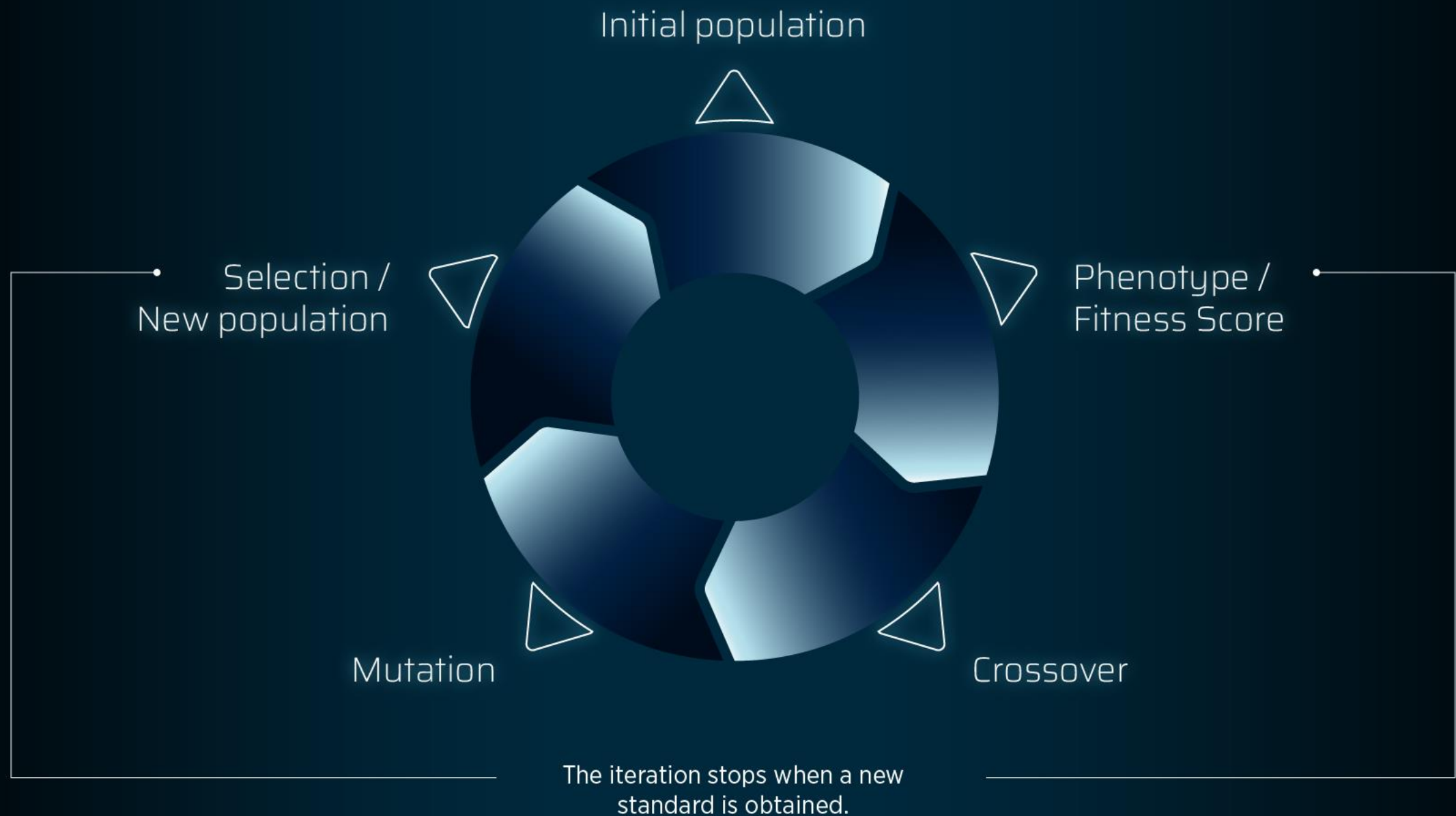


CROSSOVER

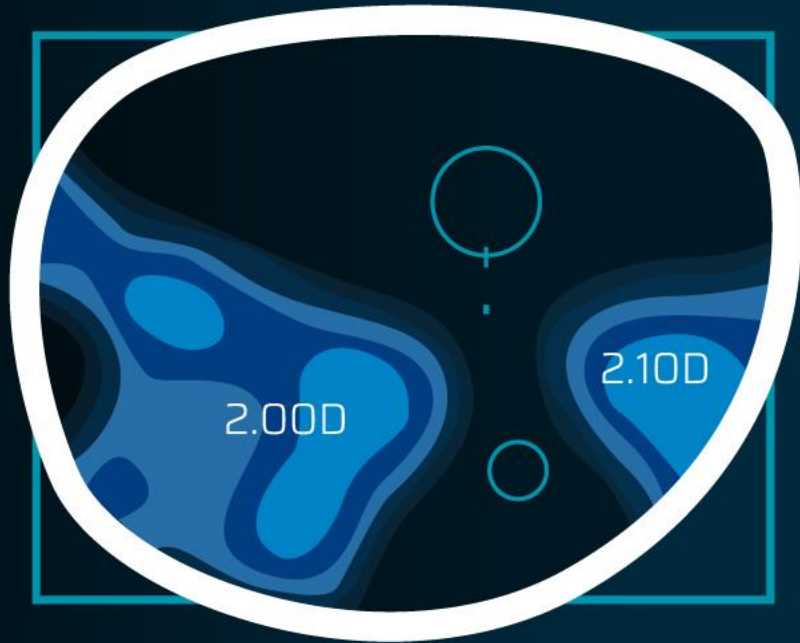


MUTATION

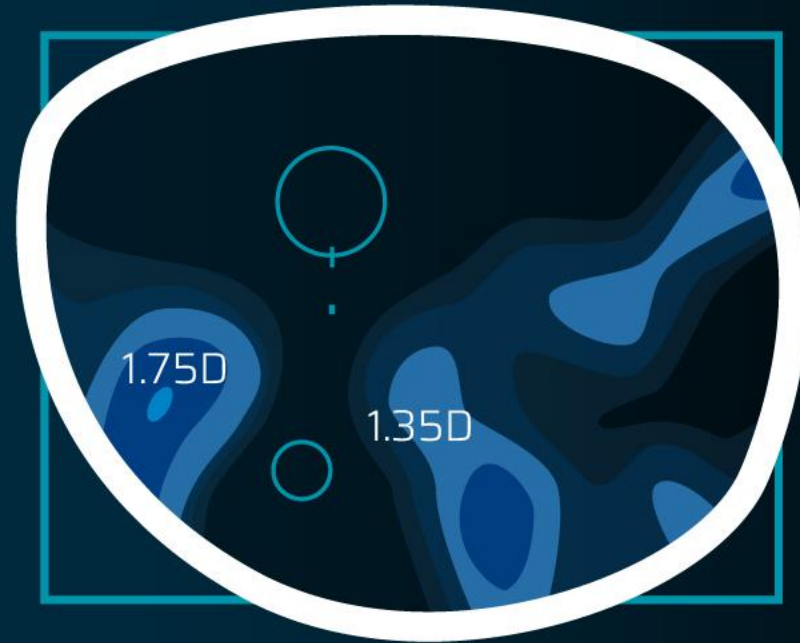




ABERRATIONS MAP



DIGITAL LENS



NOVAR AI LENS

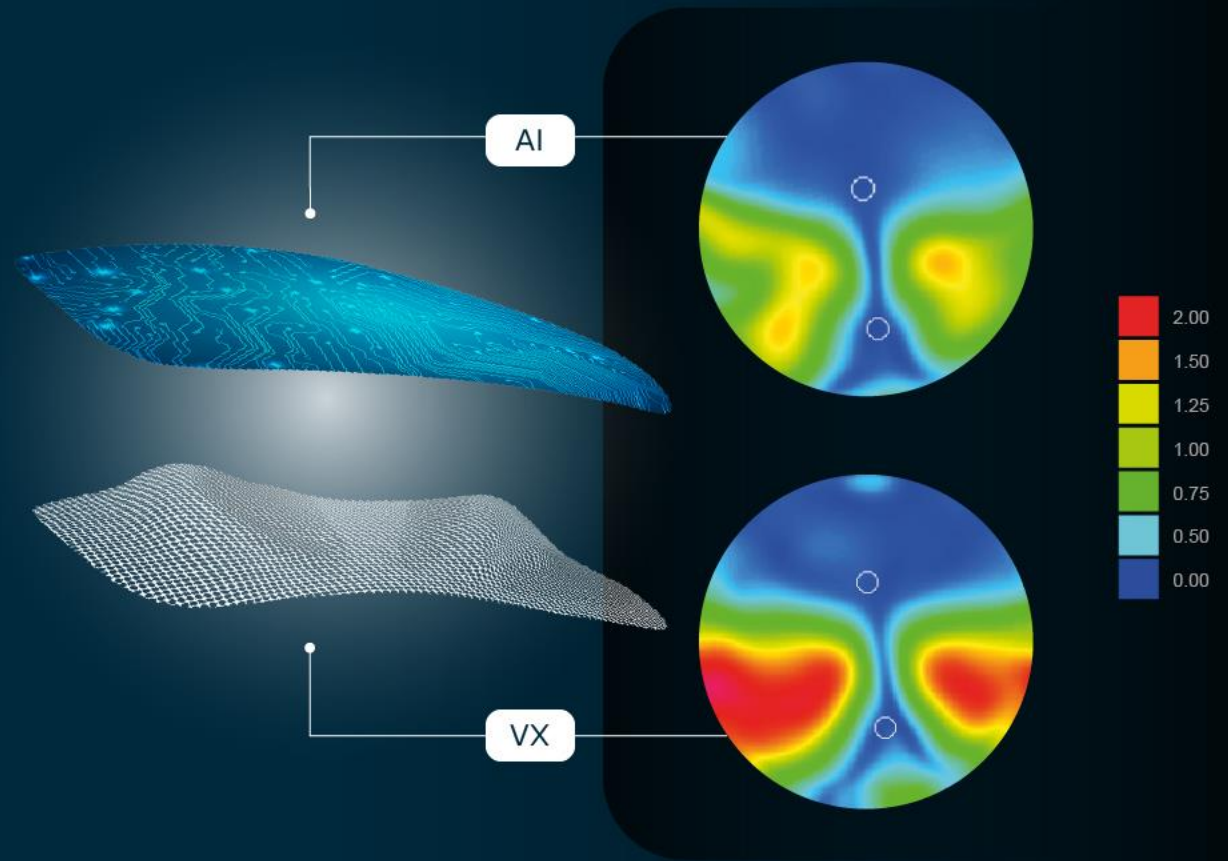
ADD: 2.00 D
MFH: 18mm

Performance

COMPARATIVE PERFORMANCE

AI·LENS vs. Digital Lenses

LARGER AND MORE
COMFORTABLE FIELDS



Clinical tests

VISUAL PERFORMANCE

01

Instant adaptation
with short
acclimatization period

02

No swimming effect
when focusing on the
lens periphery

03

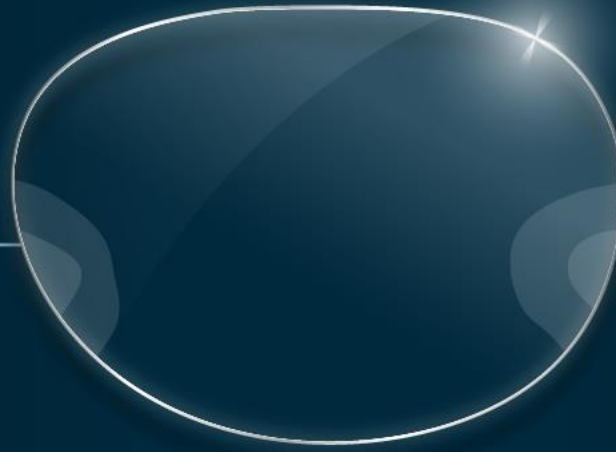
Optimized vision fields
adapted to the customer's
lifestyle

04

**Excellent spatial
perception.** Also in the
peripheral areas

05

**Natural vision in all
situations** (day and
night)



novar