

Content and Graphics in the Virtual Atom Smasher game

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CERN 2015



Outline

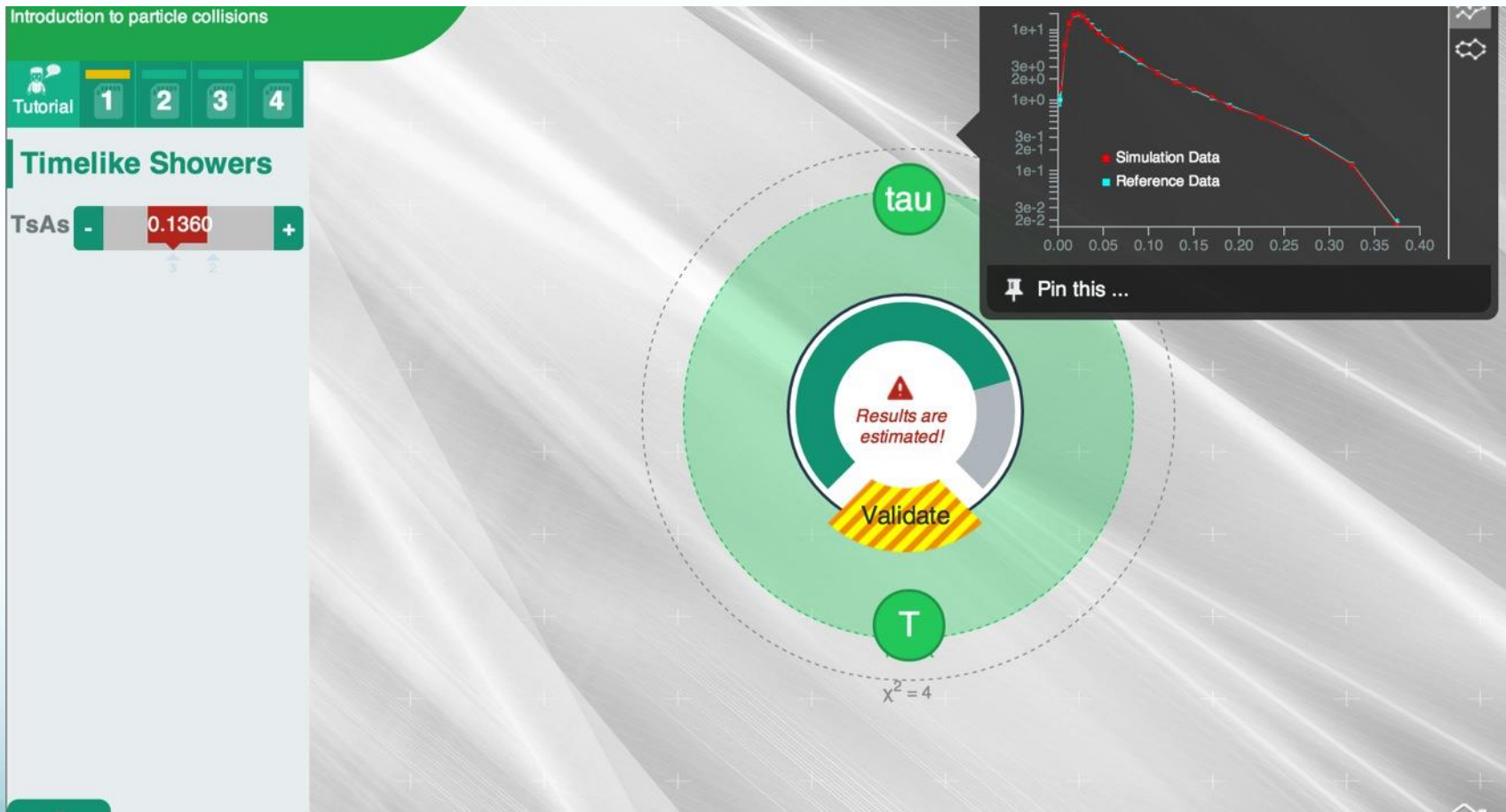
1. What is Virtual Atom Smasher
2. Collaboration with partners
3. Educational content
4. The new game graphics

1. What is Virtual Atom Smasher

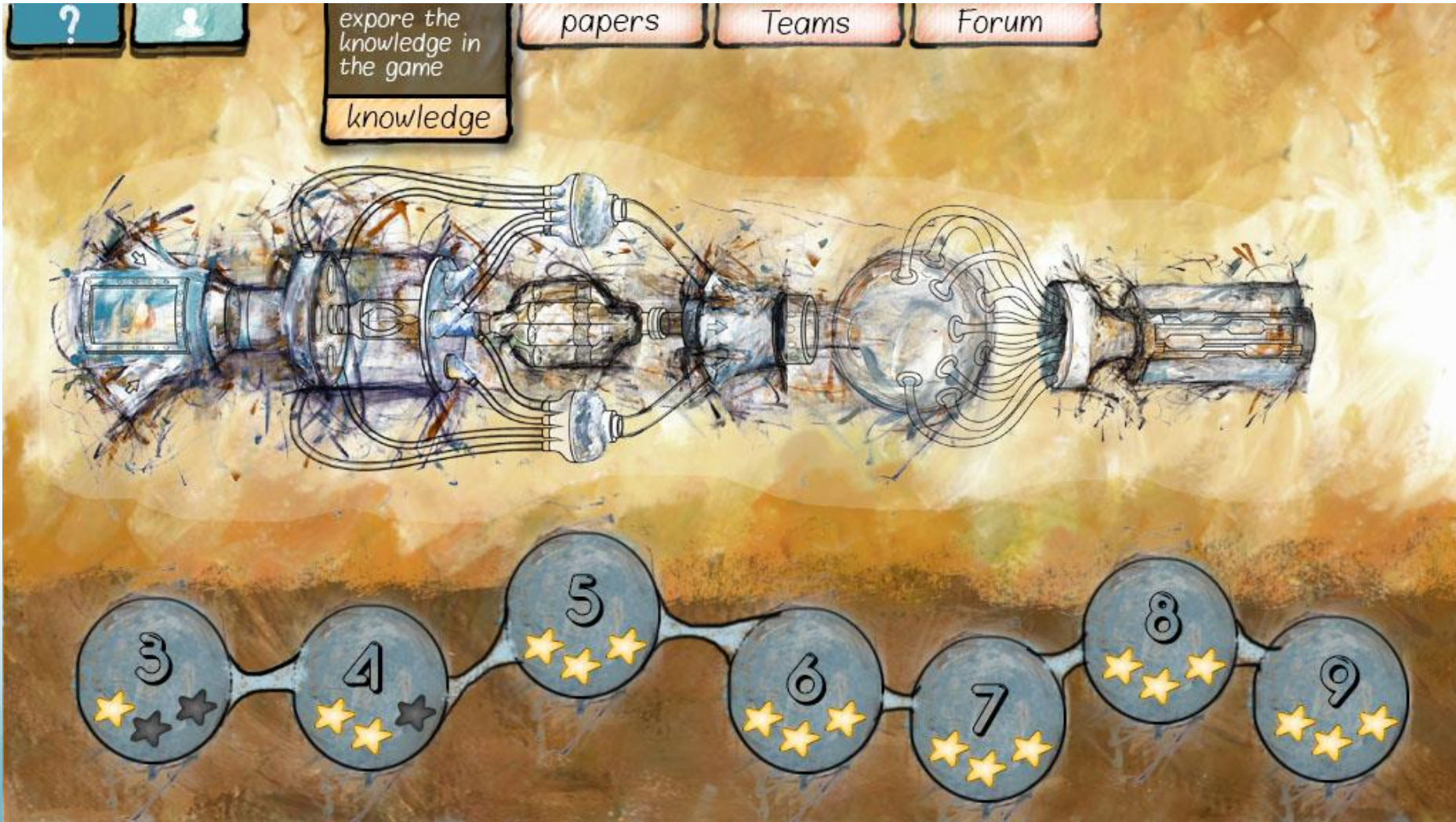
Virtual Atom Smasher

- Is a pilot project of the Citizen Cyberlab EU research project
- It is an educational platform, through which people can learn about High – Energy Particle Physics.
- It measures learning and creativity of the end-users.

V.A.S. before my collaboration



V.A.S. now



Improvements

- Added educational content
 - Simpler to understand by everyone
 - Evaluation questions in every term
 - Overall organization of the in-game knowledge
- Assisted the development of mini games
- Graphics
 - Unique style to increase interest

2. Collaboration With Partners

Collaboration with Partners

1. Evaluation and Integration of the results from Work Package 2 (WP2) of the Citizen Cyberlab project.
2. Collaboration with the University of Paris Descartes (UPD) for the development of mini games (WP3).

Evaluation and Integration of WP2

- WP2 is a research material produced before the development of the pilots :
 - Creativity Requirement (UCL)
 - Learning Behaviors (UNIGE)
 - Community Engagement (TMC)

Evaluation and Integration of WP2

1. Gamification
 - A means of sustaining and motivating participation
2. Belonging in a group
 - Gamer's,
 - Scientific
3. Team spirit with a Common Goal
 - Bonds the players
 - Engages them in the game

Evaluation and Integration of WP2

4. Competition

5. Recognition of achievements

- Strengthening the individual identity

6. Contribution

- Gives the feeling that the players effort is useful
- The player's achievements are taken into consideration

Evaluation and Integration of WP2

7. Record of Personal Progress

- Discovering own capabilities

8. Communication and Socializing

- Sustaining engagement by participating in social interactions
- Forums
 - Contact with the scientists and with each other


Evaluation and Integration of WP2

9. What is Behind the Scenes

- What is the the theory and the scientific research behind the game
- Who are the scientists behind the game


10. Progress of the project

Integration of WP2 in V.A.S.

 Science Points: 26

Papers

In this window you can see all the papers you and your team has cited in order to use their values as reference. You can also see your own saved values.












Title	Team	Score
 egw's first paper	(Selected Paper)	1.5357


Search for paper Filter + New Paper

Description Unlock Current Results Papers

Explored Knowledge

There are many scientific terms in the game that you can discover and read. When you feel ready, you can take a test and gain up to 10 science points!










-  Alpha Strong Coupling Constant (α_s)
-  Parton
-  Hadron
-  Lepton
-  Electron
-  Muon
-  Tau
-  Fermion
-  Strong Force
-  Coupling Constant
-  Boson

 Master Your Knowledge


Integration of WP2 in V.A.S.

Newbies

The team for the new users

Name	Papers	Points
 KonradJende	1	8
 Athena	1	8
 Francois	1	73
 Ioannis	1	106
 ICgamer	1	8
 jakob	1	8
 Mona	1	8
 testpali	1	8
 himmelattack	1	8

[Forum](#) [Change](#)

 **Take out a pen and paper!**

Here is a quick questionnaire. If you successfully pass this you can get up to **10** science points!

1. What does the name Parton describe?

- The number of protons inside the nucleus.
- Muons, after strong force interaction.
- Quarks and gluons.

[Send](#)

Virtual Atom Smasher Forum

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Virtual Atom Smasher Forum > Private Messages > Compose

Menu

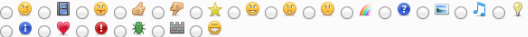
- User CP Home
- Messenger
- Compose
- Inbox
- Sent Items
- Drafts
- Trash Can
- Tracking
- Edit Folders
- Your Profile
- Edit Profile
 - Change Password
 - Change Email
 - Change Avatar
 - Change Signature
- Edit Options
- Miscellaneous
- Group Memberships
- Buddy/Ignore List
- Manage Attachments

Compose a Private Message

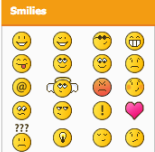
Recipients: (BCC)

Separate multiple user names with a comma. You may send this message to a maximum of 5 people.

Subject:

Message Icon: no icon 

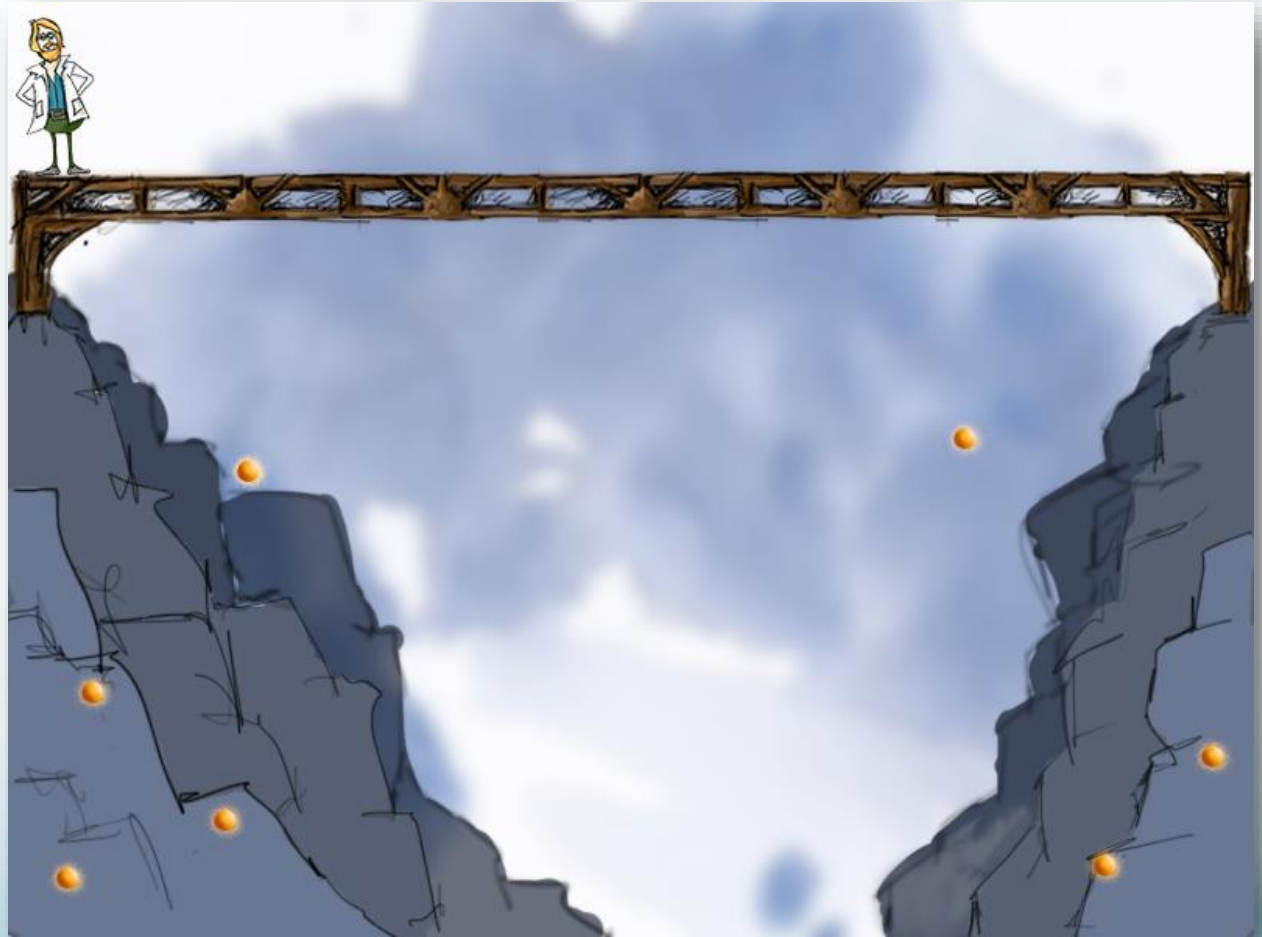
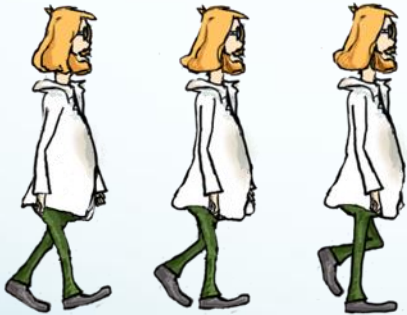
Message:

Smilies:  [get more]

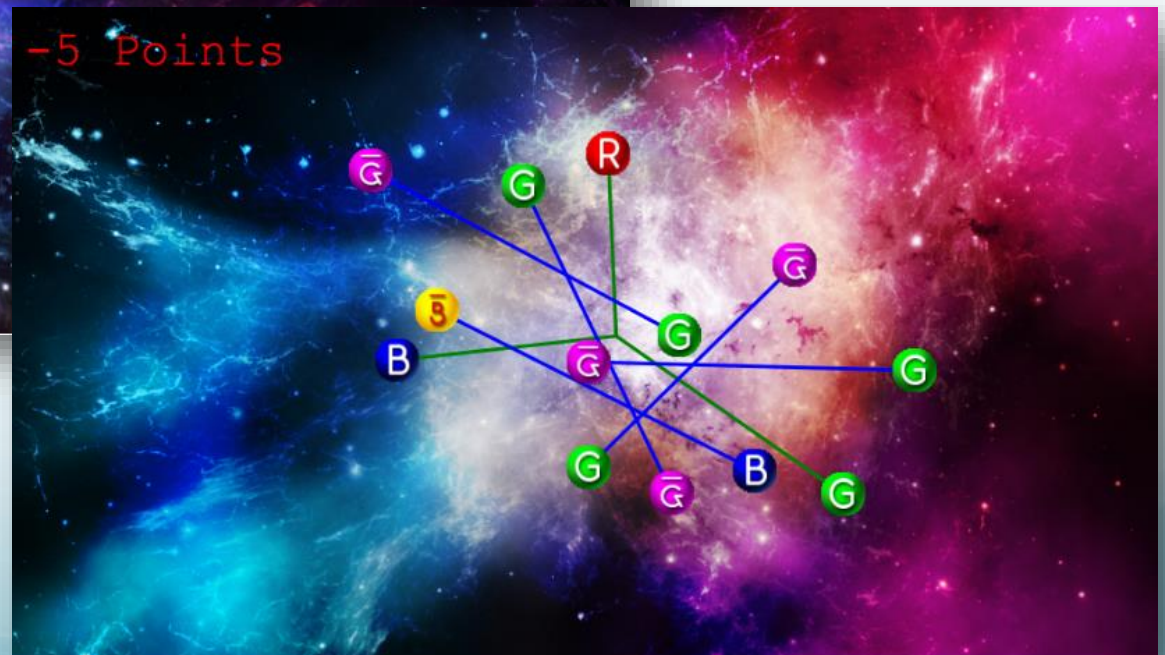
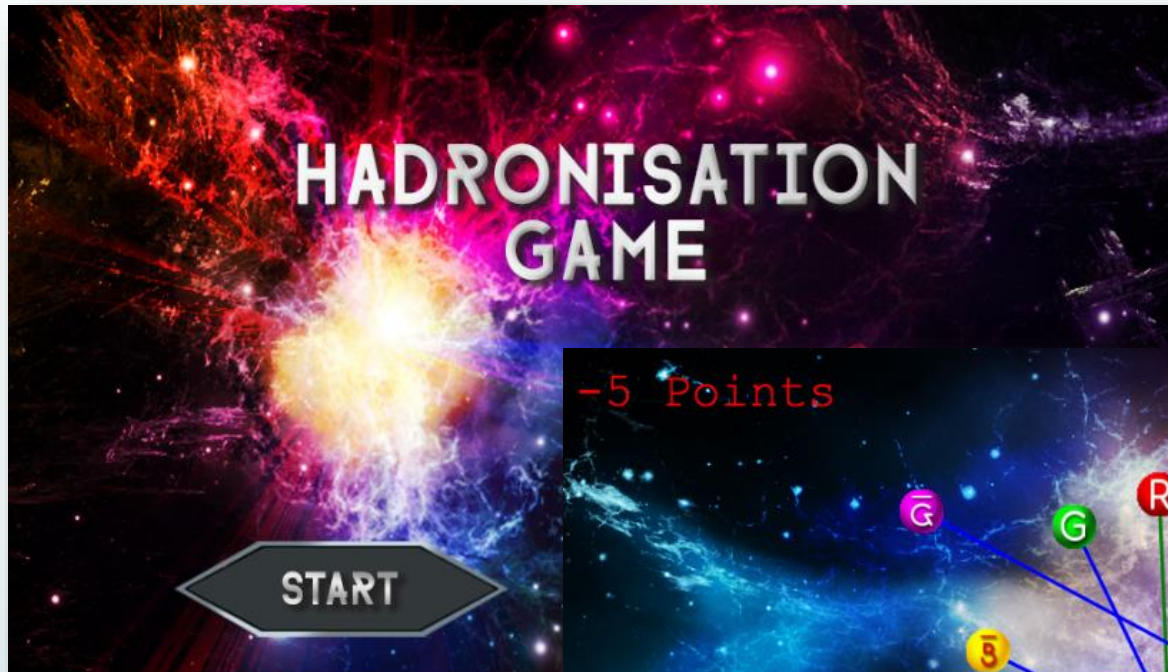
Collaboration with UPD

- Created the specifications of three educational mini games
 - Introduction to Hadronization
 - Introduction to Color Charge
 - Explanation of Final State Radiation
- Designed the graphics of each mini game
- Overseeing the development process

Collaboration with UPD



Collaboration with UPD



3. Educational Content

Content Development

- Physic's terms
 - Simplified explanations
 - Link to external material
 - Red Wire Mini games

Simplified Explanations

String-Breaking Dynamics

When strings break up into particles ([hadrons](#)), each individual hadron that is produced acquires a fraction of the total energy of the string. Energy conservation limits how many particles can be produced: if each particle takes a lot of energy, only few of them can be produced (from a given length of string). We call such highly energetic particles “hard”, and they are comparatively rare. If a particle only takes a little energy, we call it “soft”, and many of them can be produced.

In this section we will constrain how much energy each particle is allowed to take, and whether that energy is represented by momentum along the string direction (longitudinal) or going off at right angles to it (transverse), by comparing to measurements of the number and energies of particles measured by the experiments. There are three main parameters that control this, one for the transverse component and two for the longitudinal one.

 Description

 Material

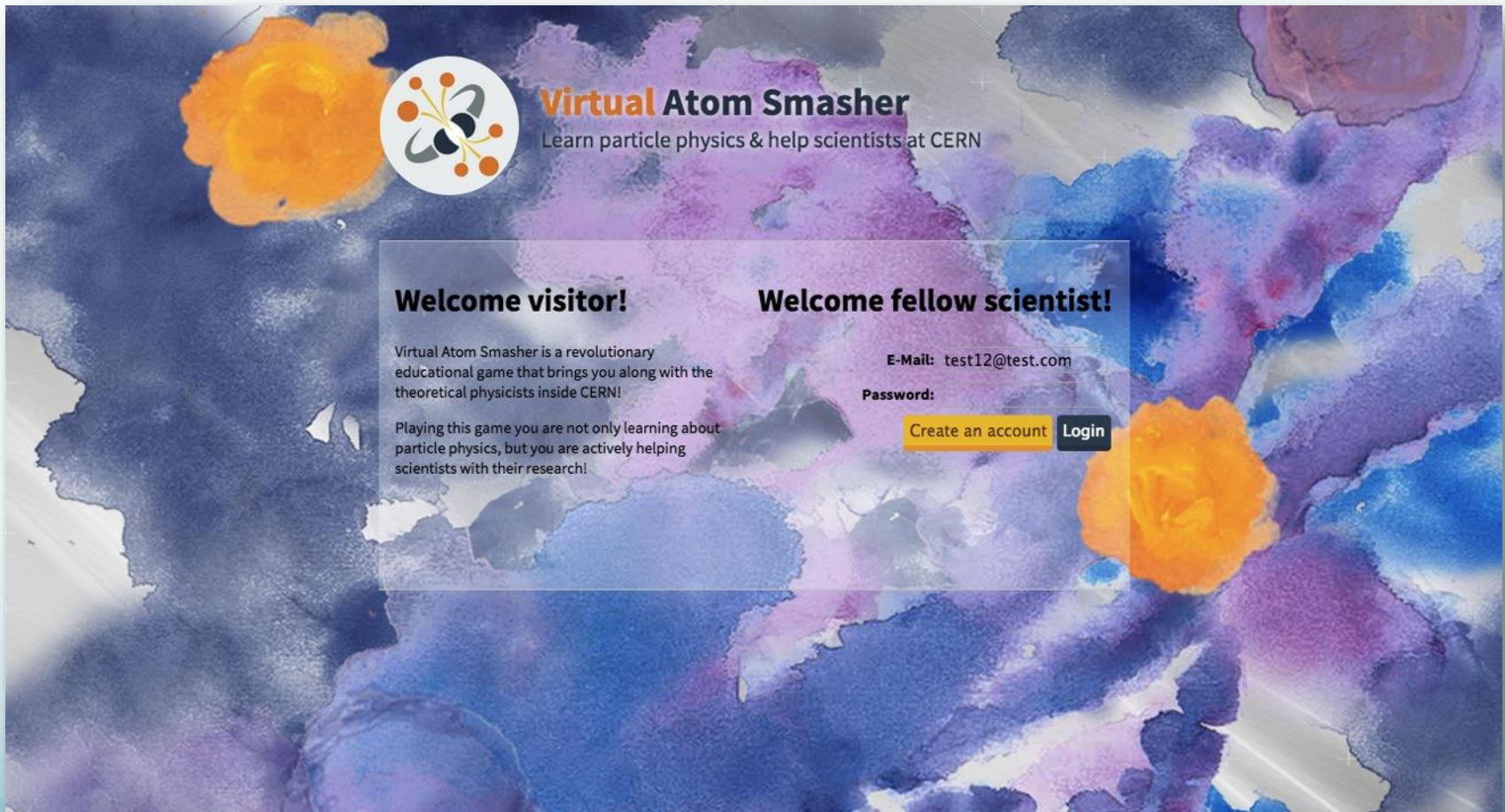
 Discuss


4. The New Game Graphics

The New Game Graphics

- Hand Drawn Post Processed Graphics
 - Series of paintings
 - Hand drawn details
 - Visually appealing design system
 - Improved aesthetics

Login Screen

The login screen features a vibrant, abstract watercolor background in shades of blue, purple, and orange. In the top left corner, there is a circular logo with a stylized atom symbol. To its right, the text 'Virtual Atom Smasher' is displayed in a bold, sans-serif font, with 'Virtual' in orange and 'Atom Smasher' in black. Below this, a subtitle reads 'Learn particle physics & help scientists at CERN'. The main content area is a semi-transparent white box containing two columns of text. The left column is titled 'Welcome visitor!' and contains two paragraphs of introductory text. The right column is titled 'Welcome fellow scientist!' and includes a form for logging in, with fields for 'E-Mail' (containing 'test12@test.com') and 'Password', followed by 'Create an account' and 'Login' buttons.

 **Virtual Atom Smasher**
Learn particle physics & help scientists at CERN

Welcome visitor!

Virtual Atom Smasher is a revolutionary educational game that brings you along with the theoretical physicists inside CERN!

Playing this game you are not only learning about particle physics, but you are actively helping scientists with their research!

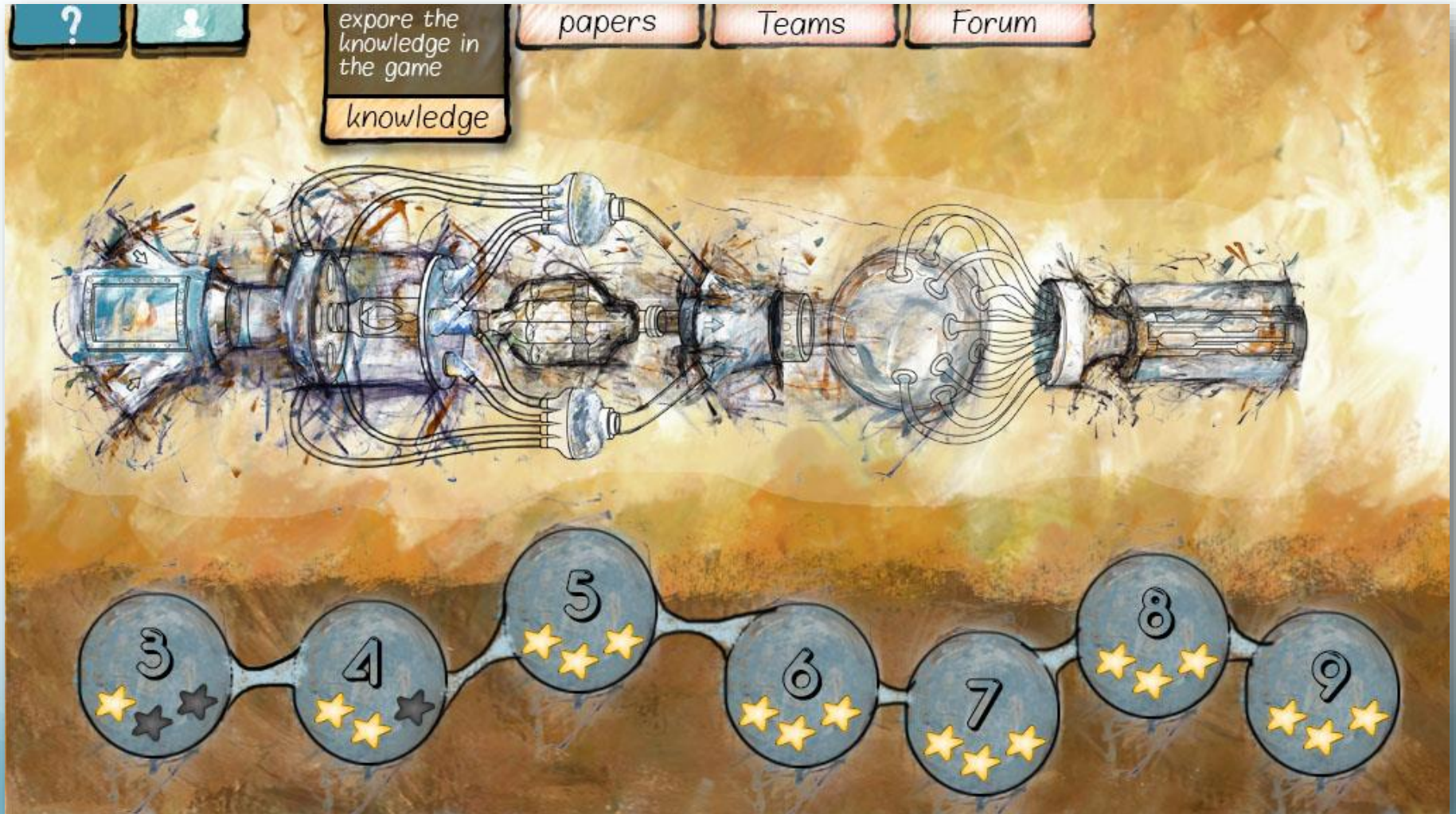
Welcome fellow scientist!

E-Mail: test12@test.com

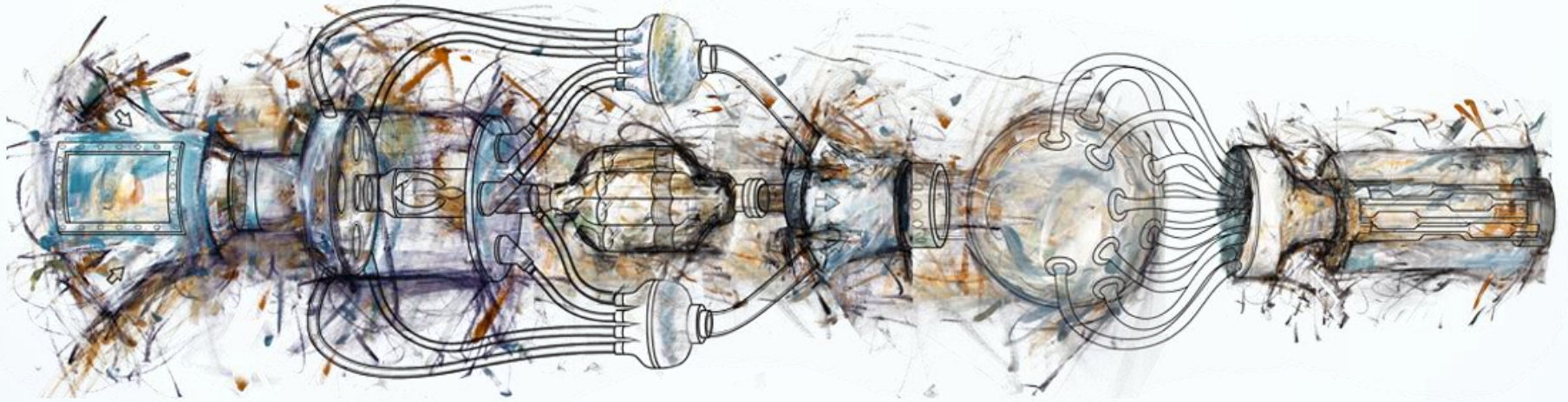
Password:

[Create an account](#) [Login](#)

Home Screen

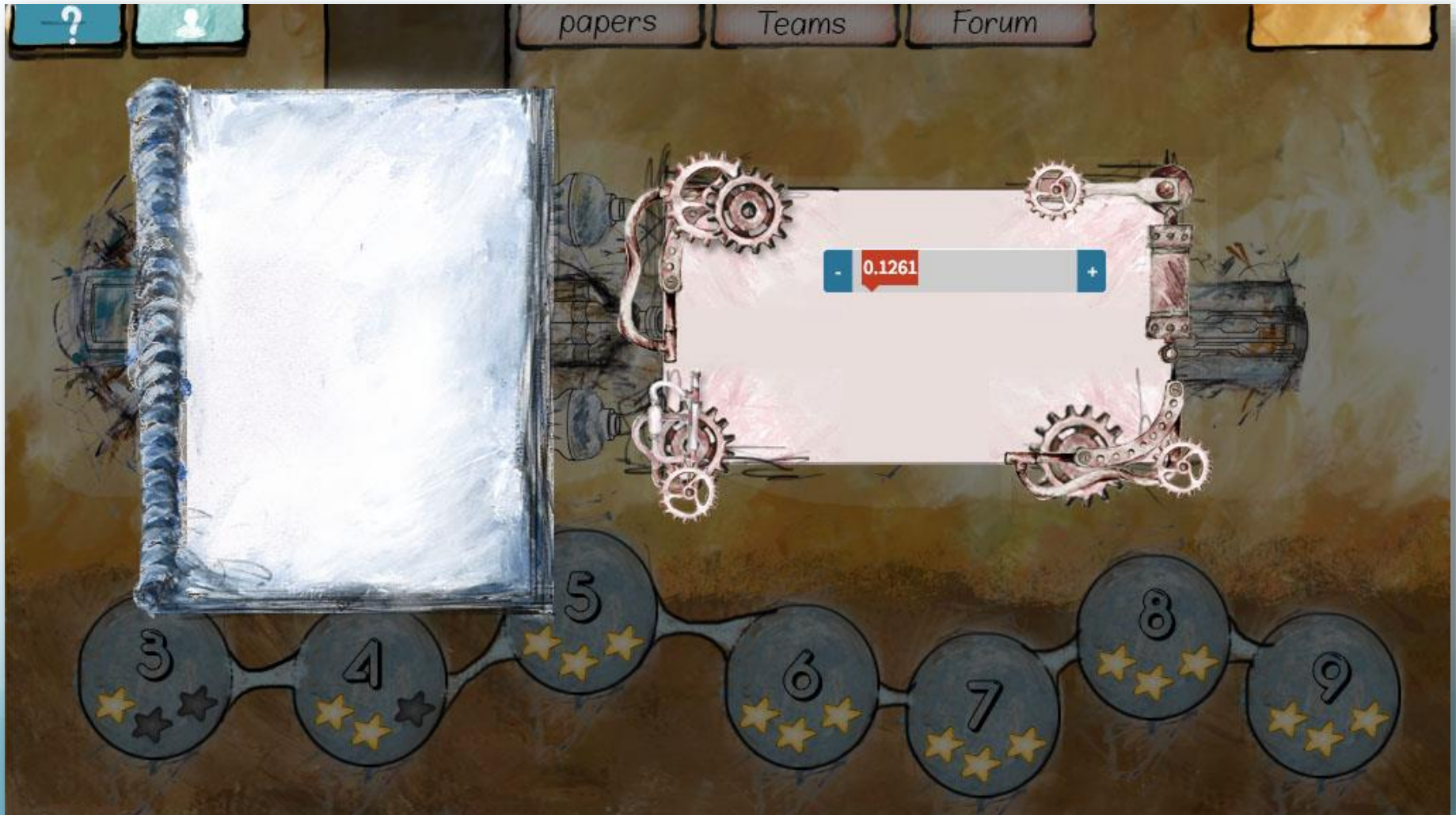


The Quantum Machine

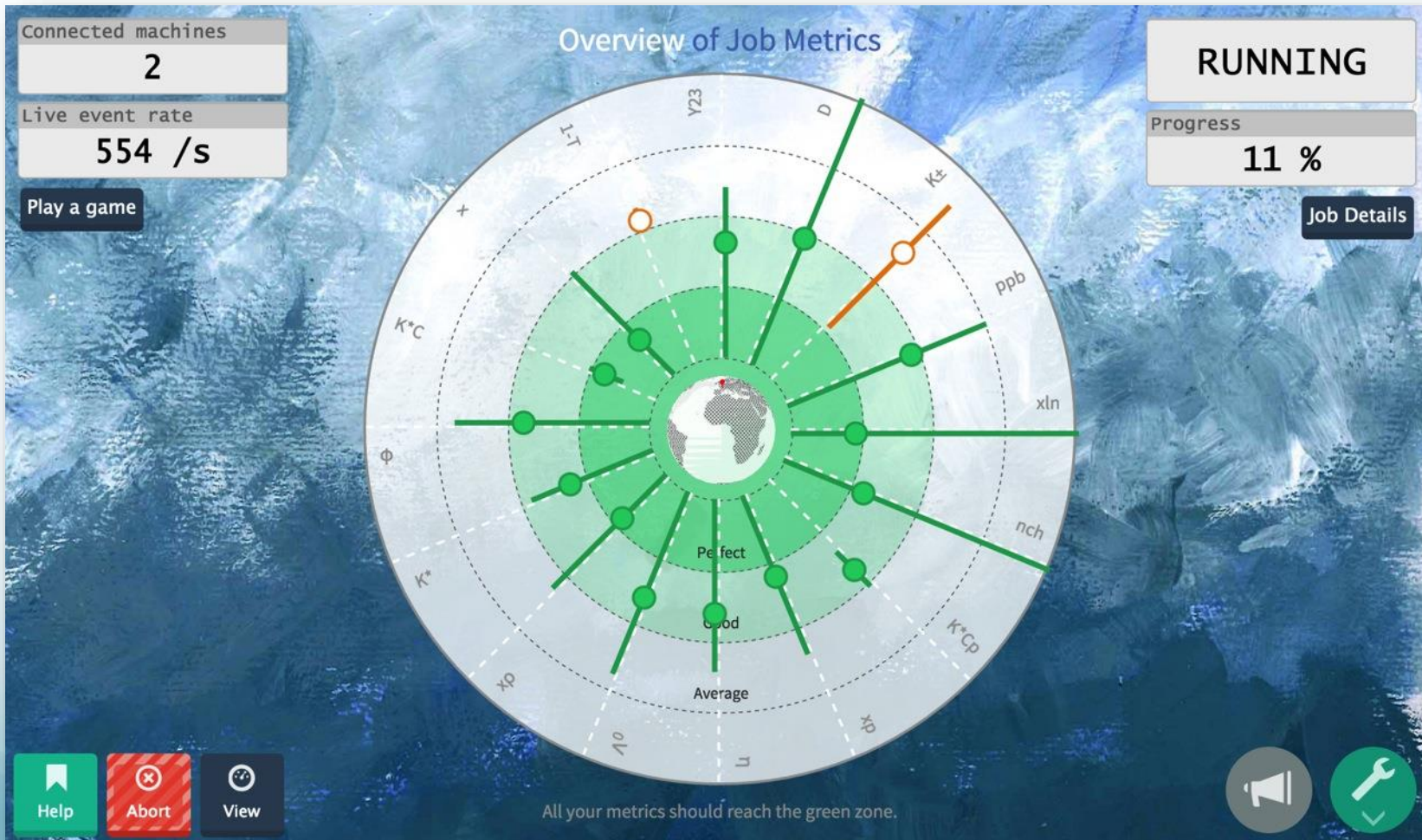


Abstract mechanical equivalent of Pythia's event generator

Tuning Screen



Simulation Screen



Help Screens

You are now running a simulation

We have just started your simulation in a network of computers provided by other players and institutions

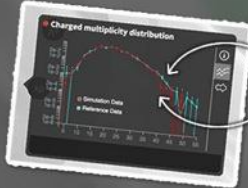


In a few seconds they are going to send results, that you can observe in this status screen

Each one of these simulations are producing virtual particle collisions, using the physics parameters that you have provided



Your results are good if your theoretical simulation matches what we have seen in the experiments



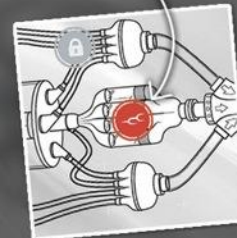
Reference: Measures the experiments

Simulation: Your simulation results

You can also see an indicator: The closer

Welcome to the Virtual Atom Smasher

(1) Click the red button to open a machine part



(2) Change a model parameter



(3) Click 'Validate' to run the simulation and check your choices



Hint: You can click 'Estimate' to see how your changes might affect the results)



← We are looking on the results of other people with similar choices to yours... this is not a real simulation and the results might not be the correct ones!

We are waiting for
your feedback !

<http://test4theory.cern.ch/vas>