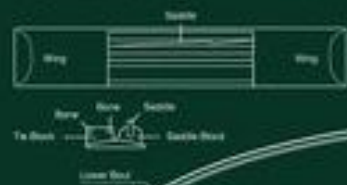


Использование законов физики в музыке



SADDLE AND BRIDGE

The bridge and saddle transfer vibrations from the strings to the soundboard. The saddle is made from bone or plastic, and is compensated to provide proper intonation. It determines string height and effective length. The bridge is usually made from a single piece of rosewood or ebony. It consists of a saddle block that houses the saddle, and a deck block into which strings are tied. The deck is also braced with bars on both sides to prevent the strings from distorting the wood and often contains a decorative inlay. Wings on either side of the bridge transfer the pulling force from the strings to the soundboard.

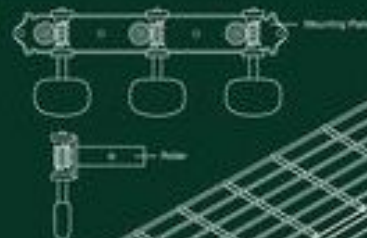


Soundboard Bracing Patterns



HEADSTOCK AND TUNING MACHINES

The headstock is attached to the top of the neck, and contains the tuning machines. The neck and headstock are often carved from a single piece of wood. They are also braced together with a head plate. The weight and length of the headstock affect the sound of the guitar. It is shaped to prevent the strings from pulling on the nut. Classical guitar headstocks are usually locking. The tuning machine refers. The tuning machines are mounted on the sides and use gears to provide precise and stable tuning. Often, tuning machines are cast in brass on a single mounting plate. A hardened washer is often glued to the back of the headstock to reinforce the headstock and cover up any exposed grain ends.



NUT

The nut is located at the top of the fretboard at the base of the headstock. It determines string spacing and height at the zero fret. The nut is made from bone or plastic and is compensated to ensure proper action and intonation. The string slots are cut into the nut and are often filled with a decorative inlay. The nut is also braced with bars on both sides to prevent the strings from distorting the wood and often contains a decorative inlay. Wings on either side of the bridge transfer the pulling force from the strings to the soundboard.

STRINGS

The highest three strings on the guitar are made from nylon. Traditionally, these strings were made from gut. These strings are made from two nylon filaments wound in various ways or silver-plated copper wire. These are all wound in pairs. Strings of historical guitars contain two braided silver-wound flat-iron strings, which wrap around steel rail.



Выполнил: Леонов Юрий
Алексеевич,
учащийся 11 класса

Цель:

- ИЗУЧИТЬ С ТОЧКИ ЗРЕНИЯ ФИЗИКИ ОДИН ИЗ ВИДОВ МУЗЫКАЛЬНЫХ ИНСТРУМЕНТОВ – ЩИПКОВЫЕ СТРУННЫЕ

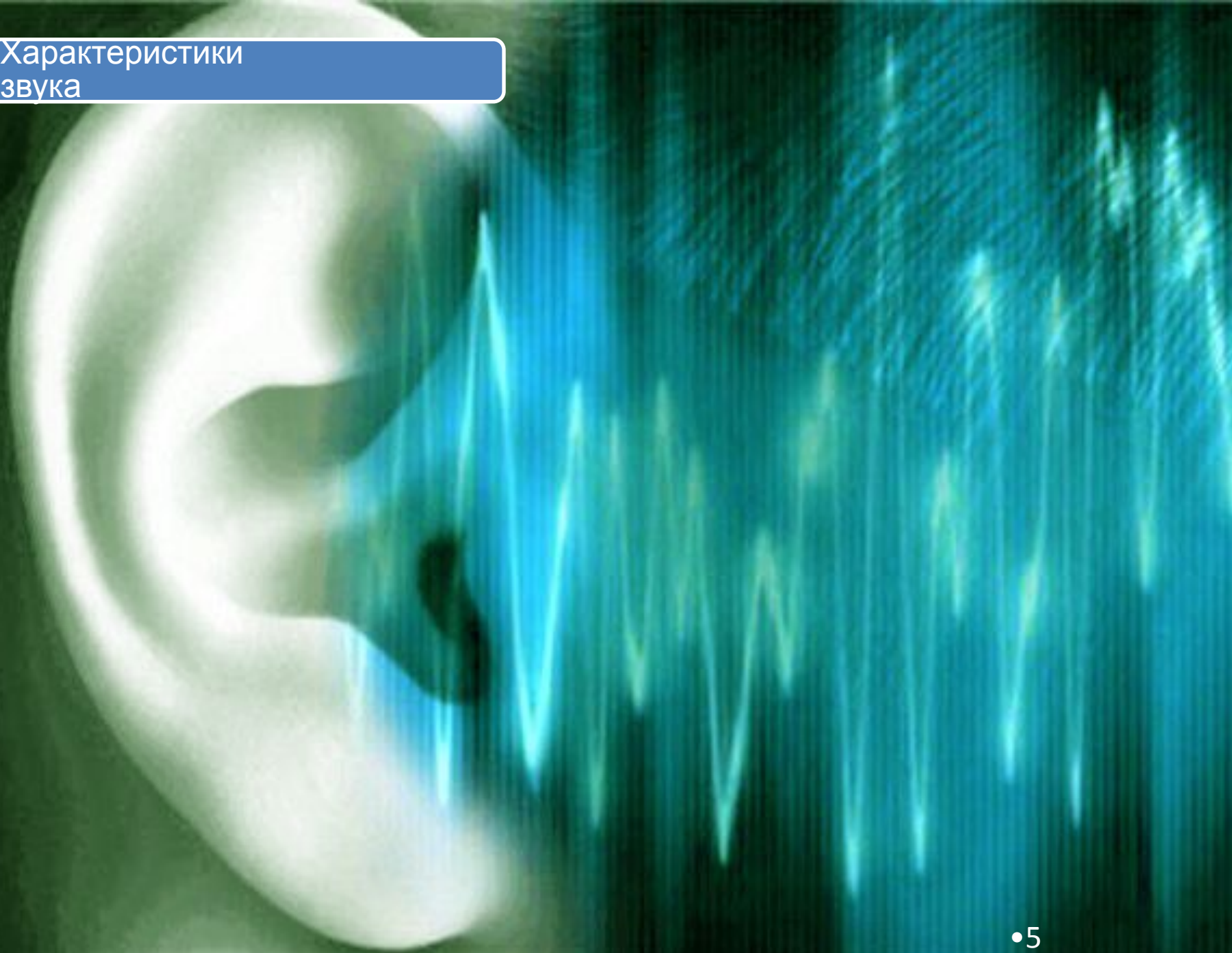
Задачи:

- изучить литературу по теме проекта
- изучить процесс формирования стоячей волны в струне

Актуальность:

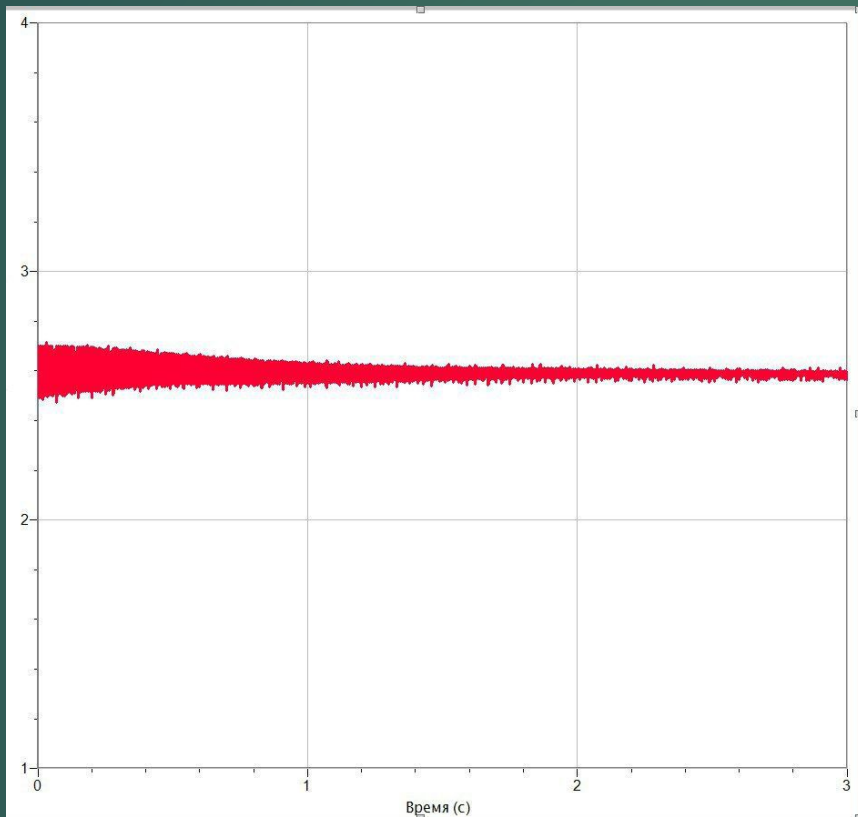
- полученные в ходе исследования знания можно использовать при сочинении и исполнении музыки.

Характеристики звука

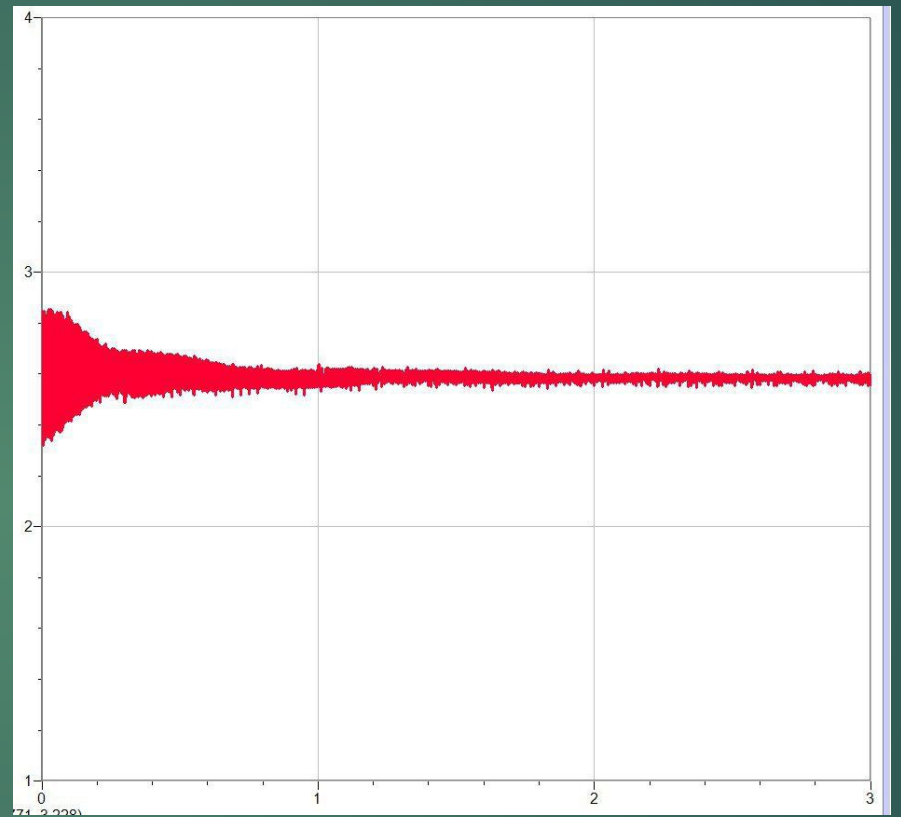


Handwritten text in a cursive script, possibly a signature or a name, written in white or light-colored ink on a dark background. The text is highly stylized and difficult to decipher.

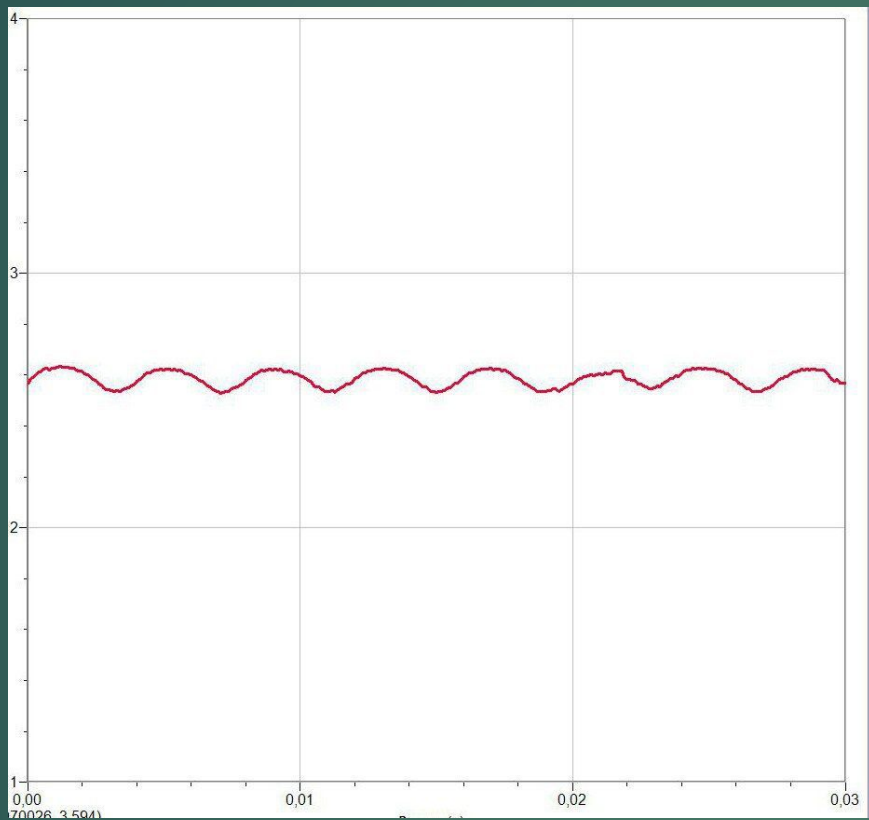




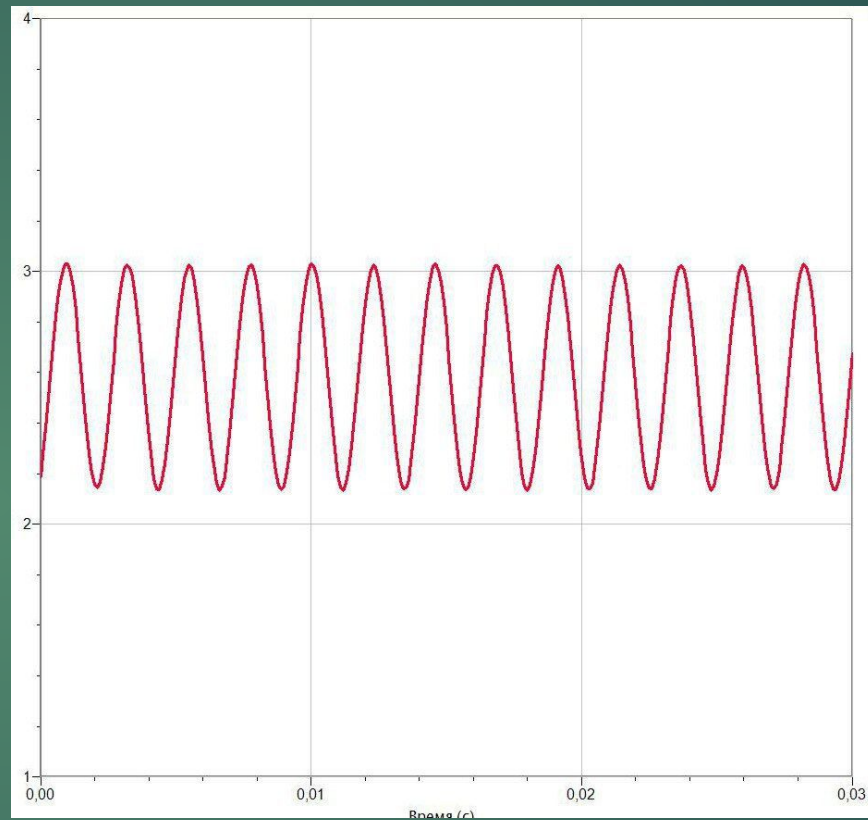
Слабый удар



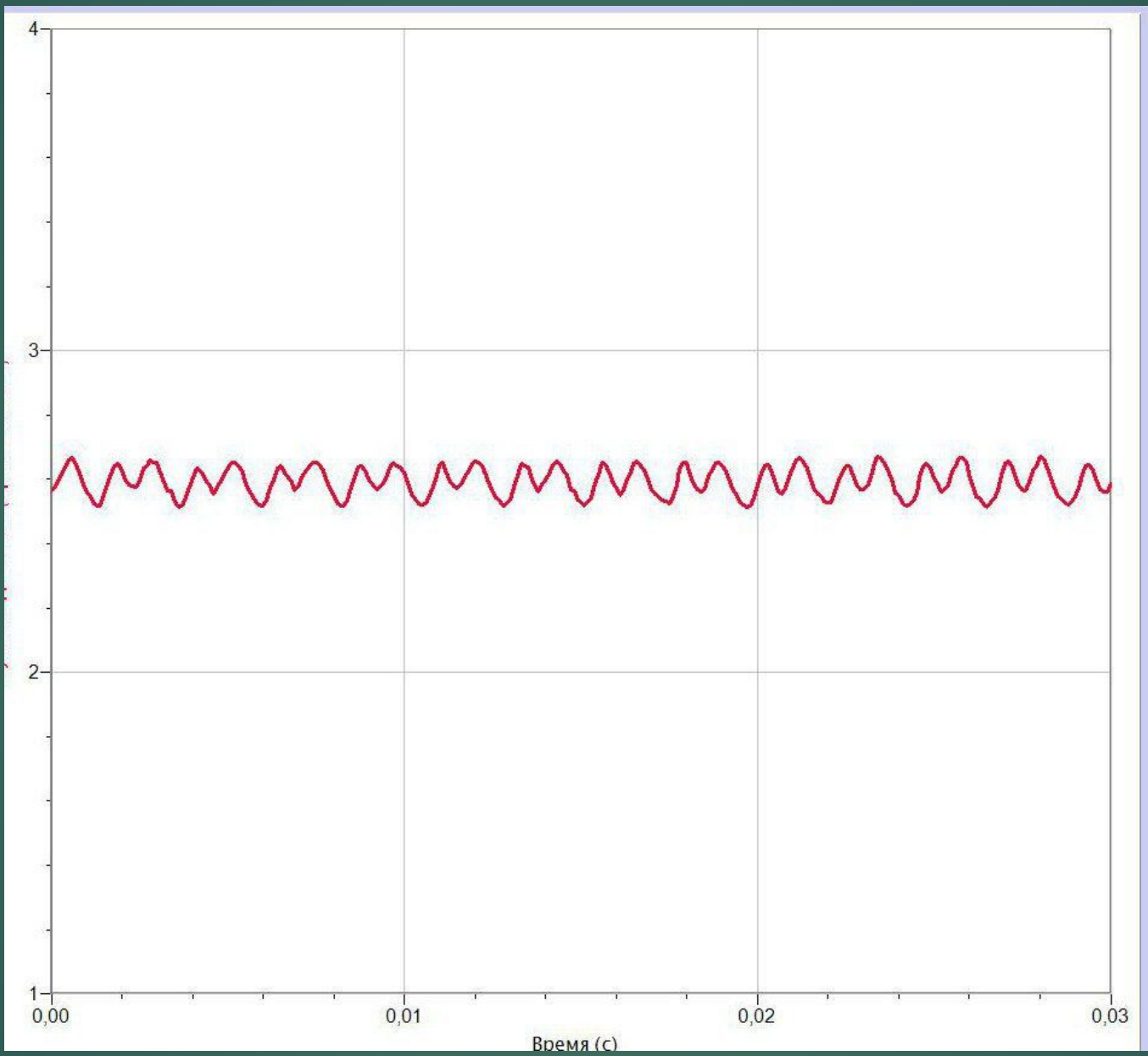
Сильный удар



56 Гц

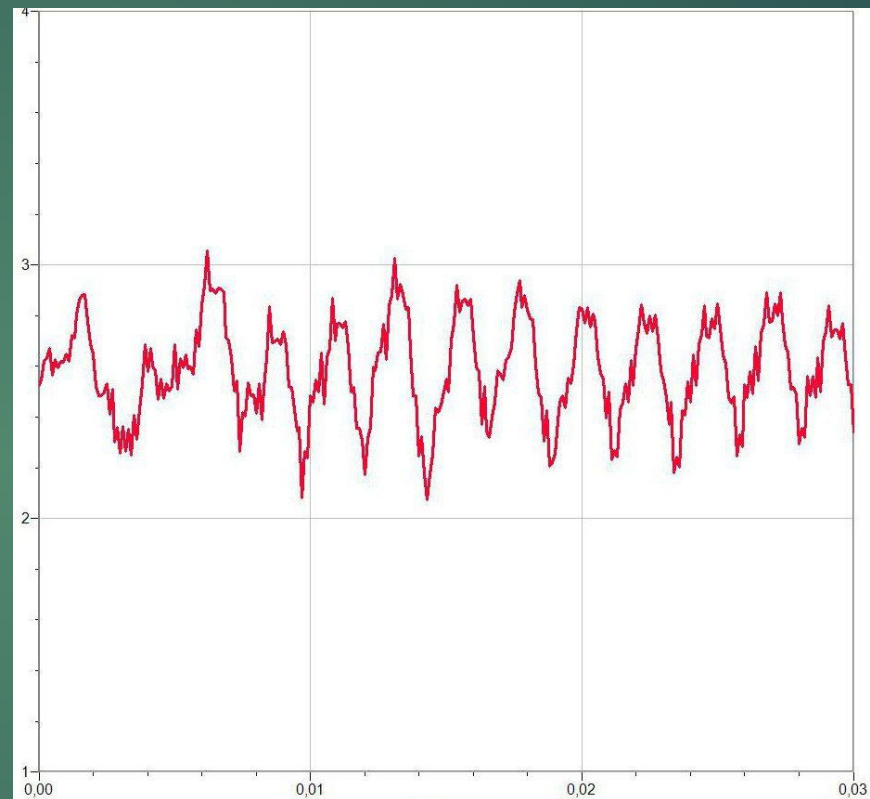
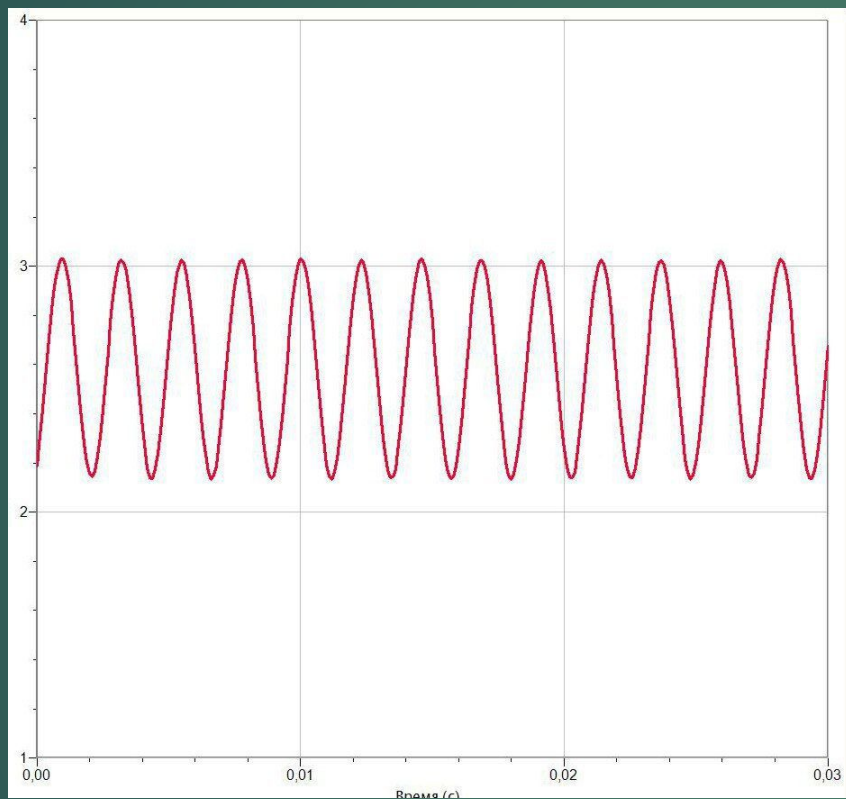


440 Гц

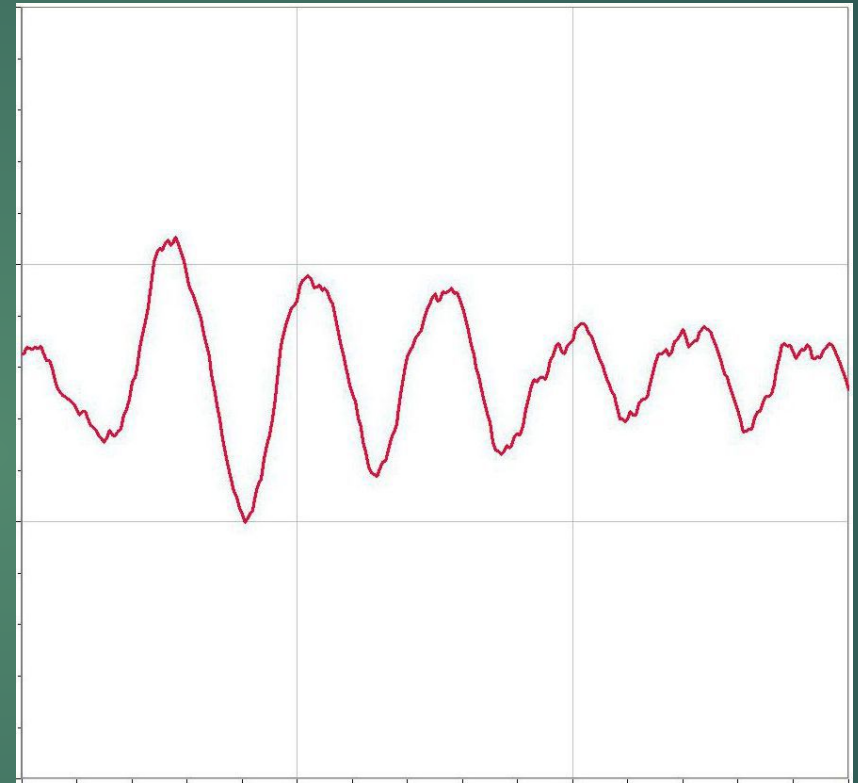
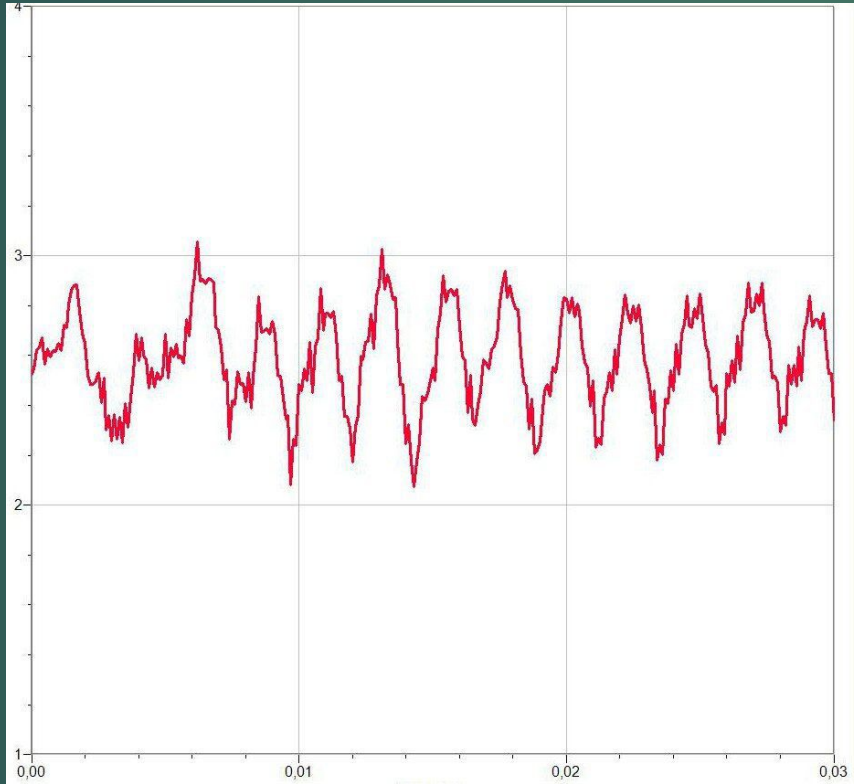


О струнах



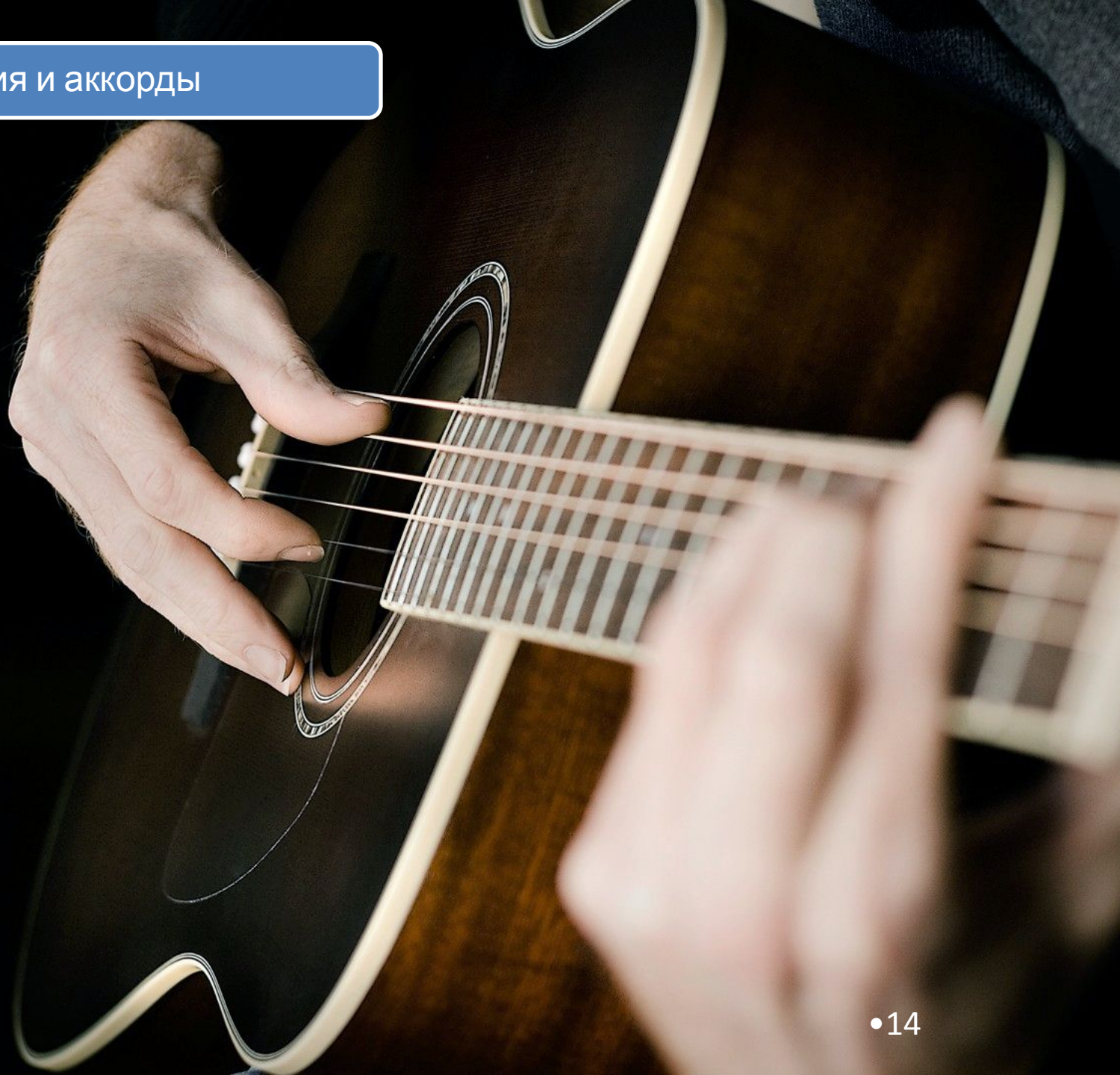


Нота Ля на камертоне и на
гитаре



Нота Ля на гитаре. Интервал
октава

Ноты, созвучия и аккорды



Интервалы и соотношения

Частот

до-до диез $277,2 : 261,7 = 1,059\dots$

до-ре $293,7 : 261,7 = 1,122\dots$

до-ре диез $311,1 : 261,7 = 1,188\dots 1,2 = \mathbf{6 : 5}$

до-ми $329,6 : 261,7 = 1,259\dots 1,25 = \mathbf{5 : 4}$

до-фа (кварта) $349,2 : 261,7 = 1,310\dots \mathbf{4 : 3}$

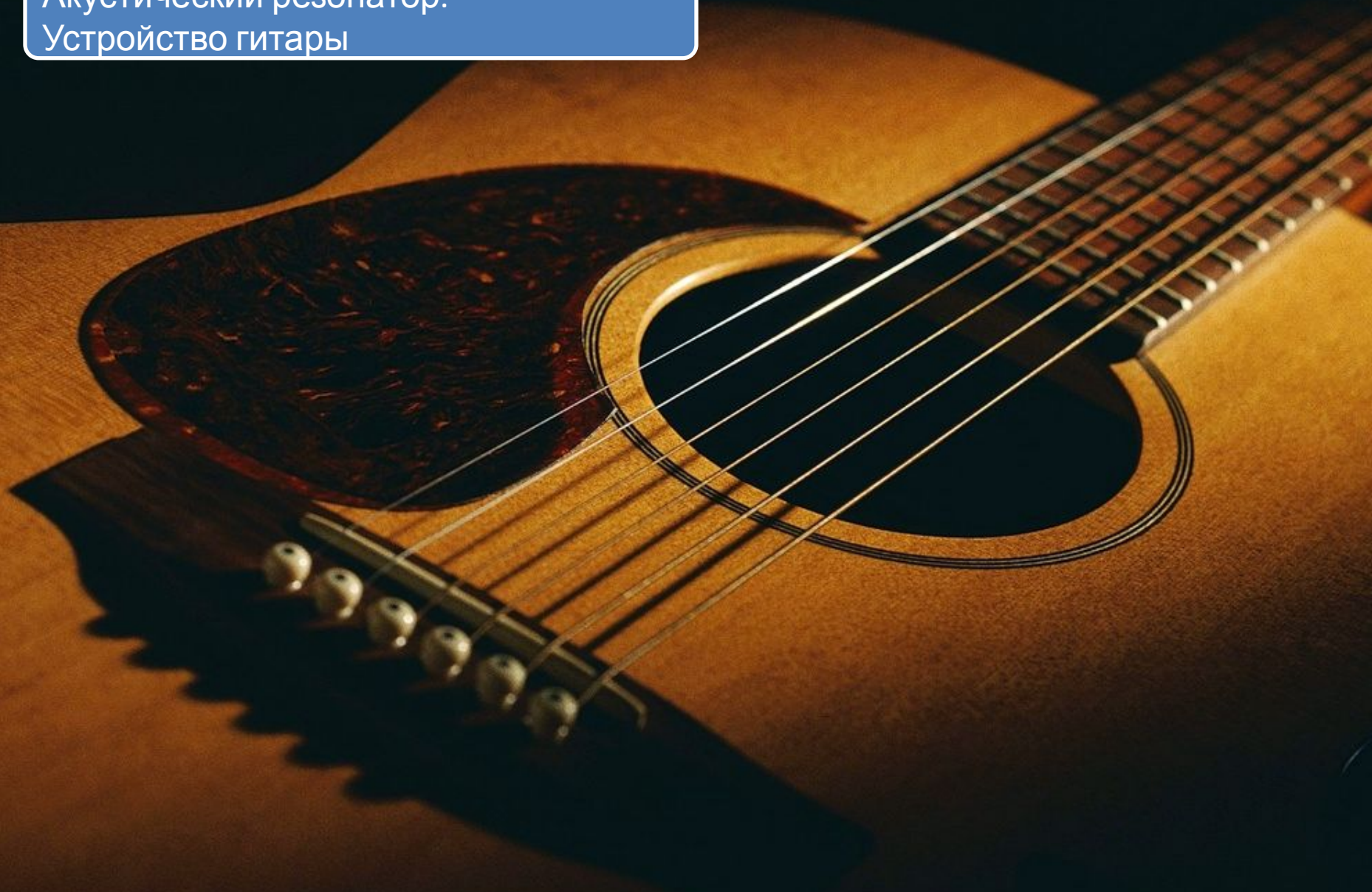
до-соль (квинта) $392,0 : 261,7 = 1,498\dots 1,5 = \mathbf{3 : 2}$

до-ля $440,0 : 261,7 = 1,681\dots$

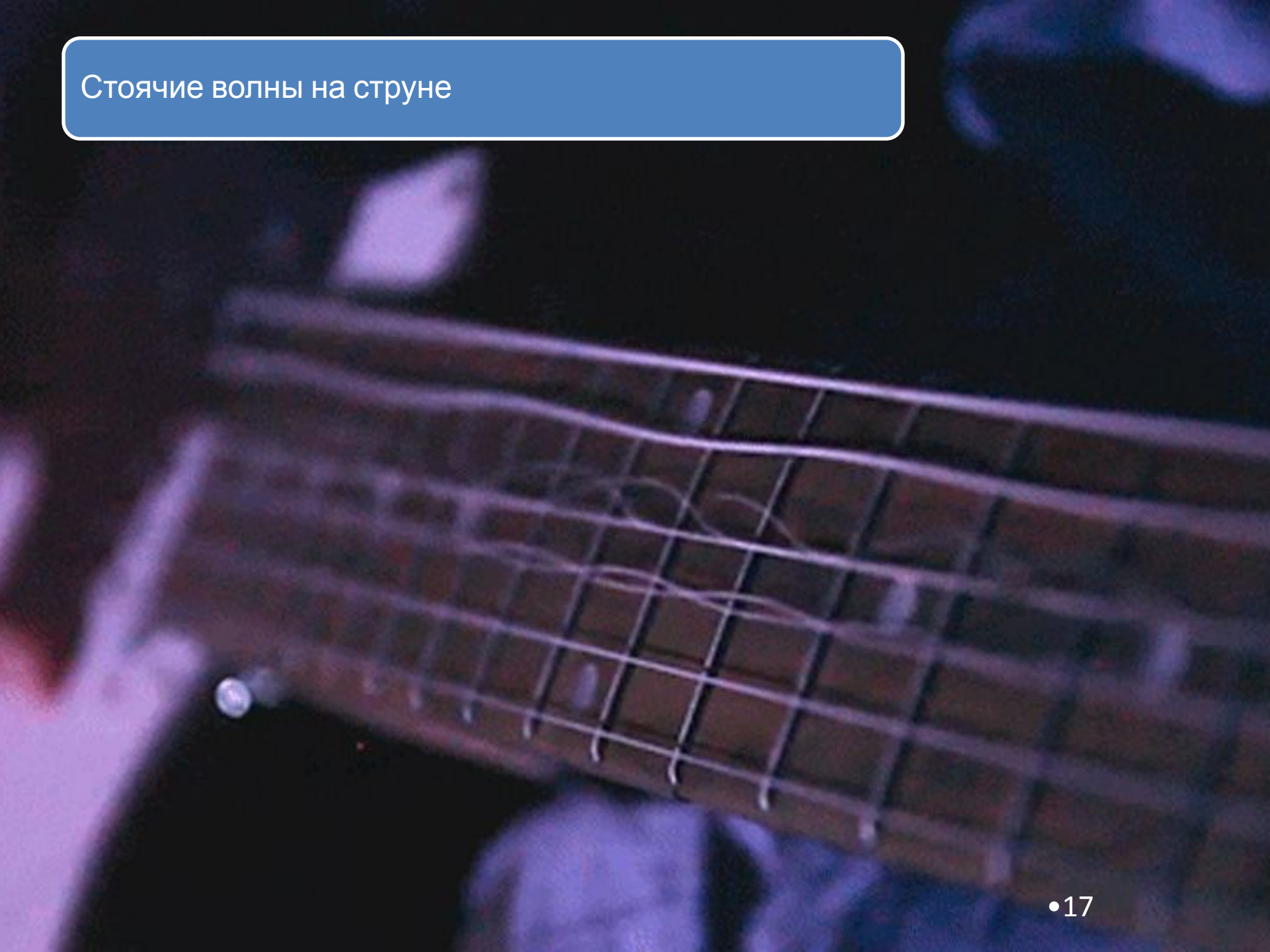
до-си $493,9 : 261,7 = 1,887\dots$

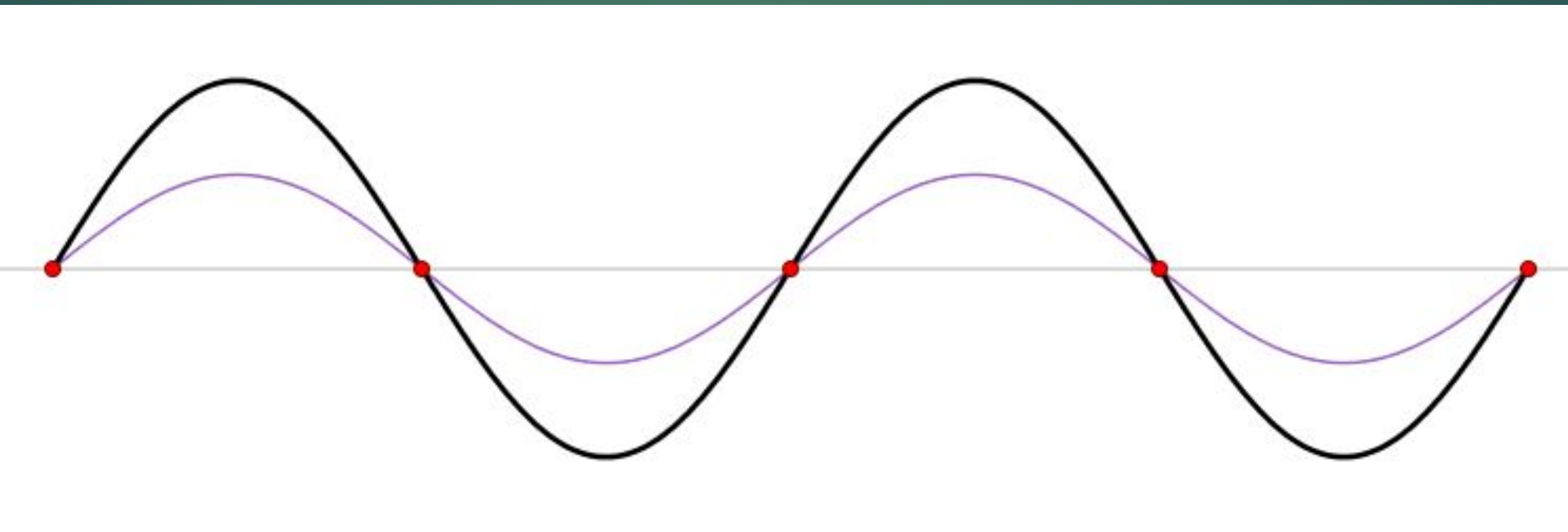
до-до (октава) $523,4 : 261,7 = \mathbf{2 : 1}$

Акустический резонатор.
Устройство гитары

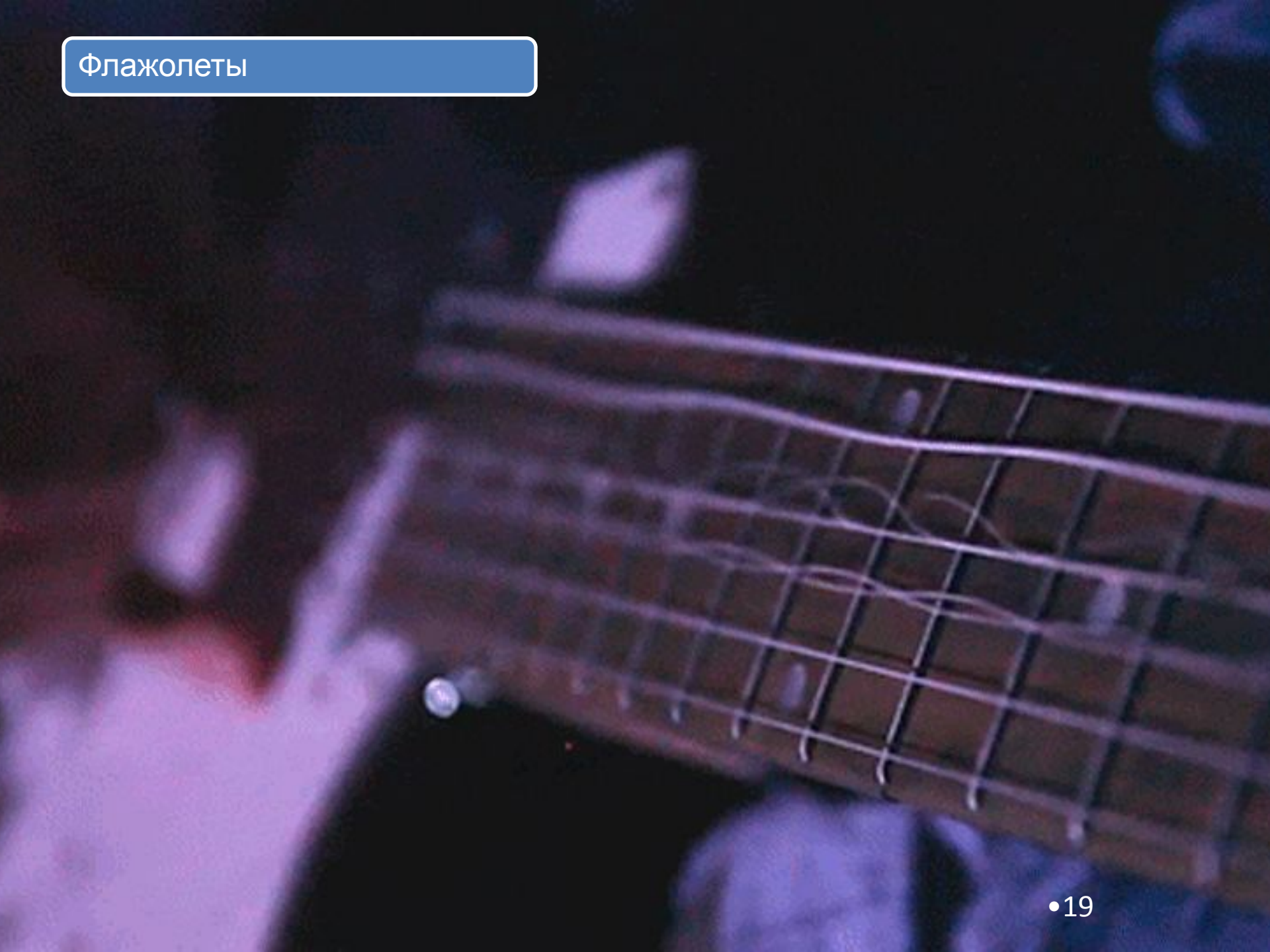


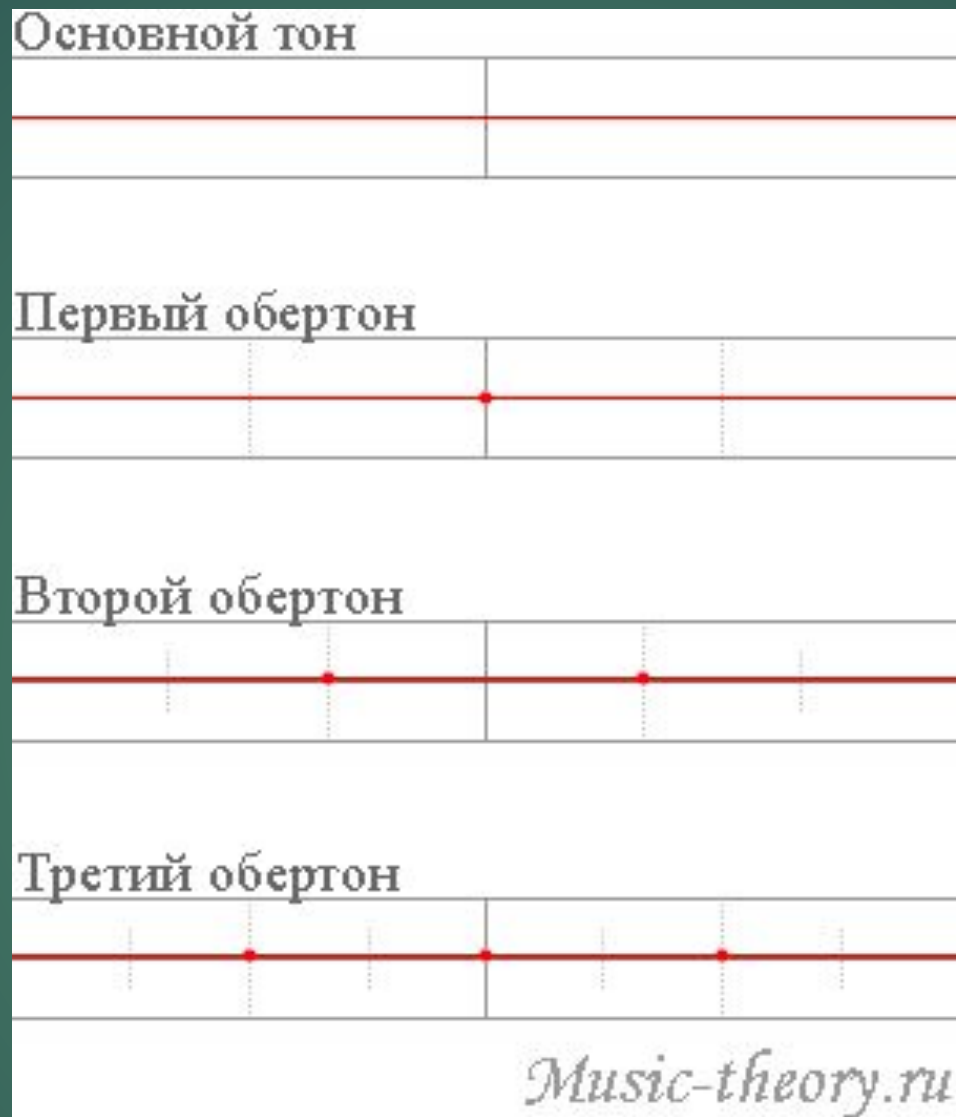
Стоячие волны на струне



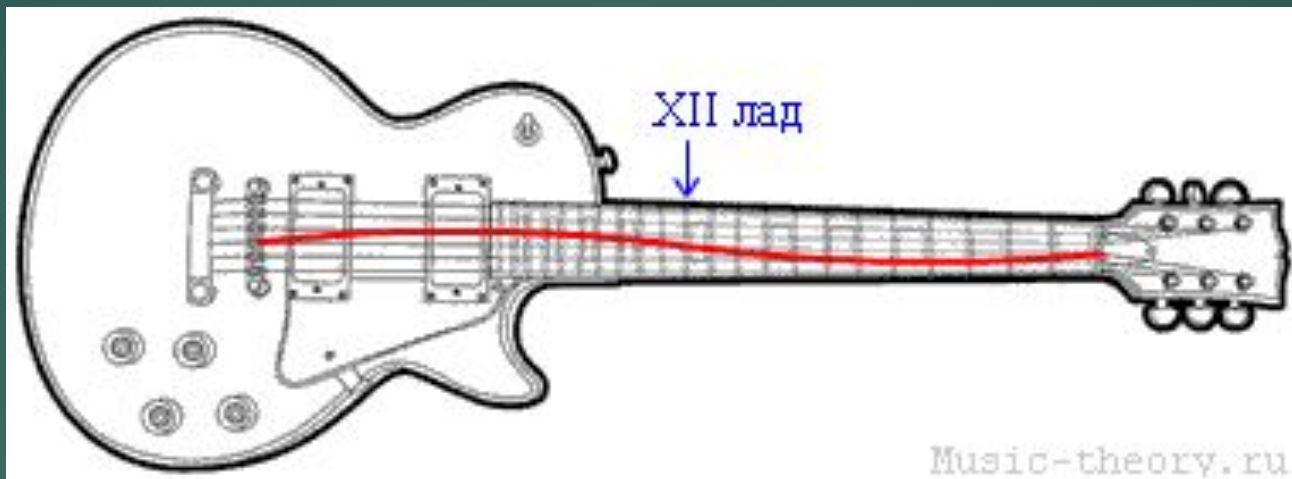


Стоячая волна

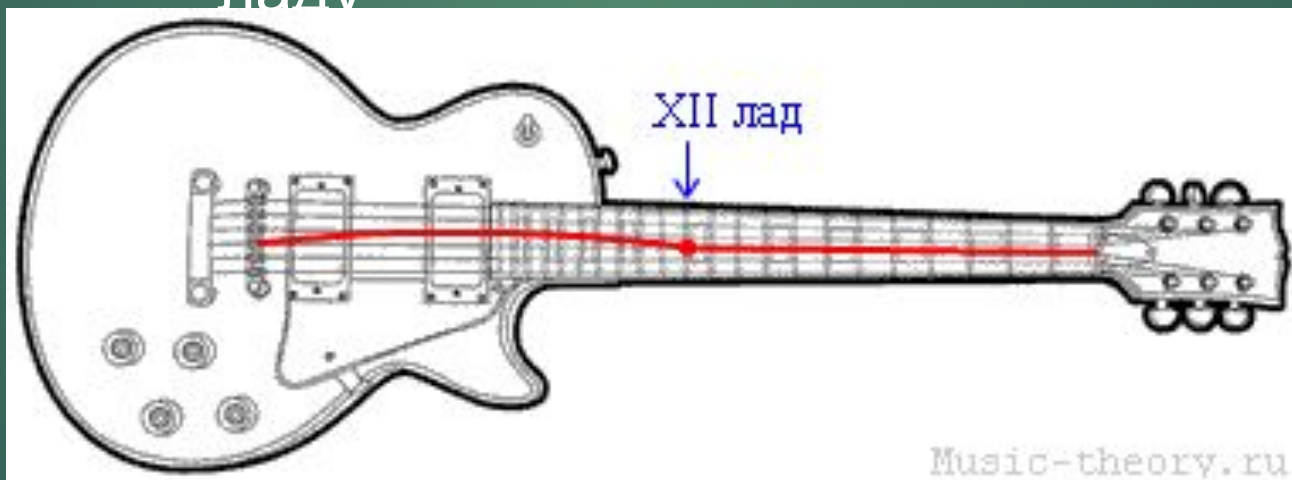




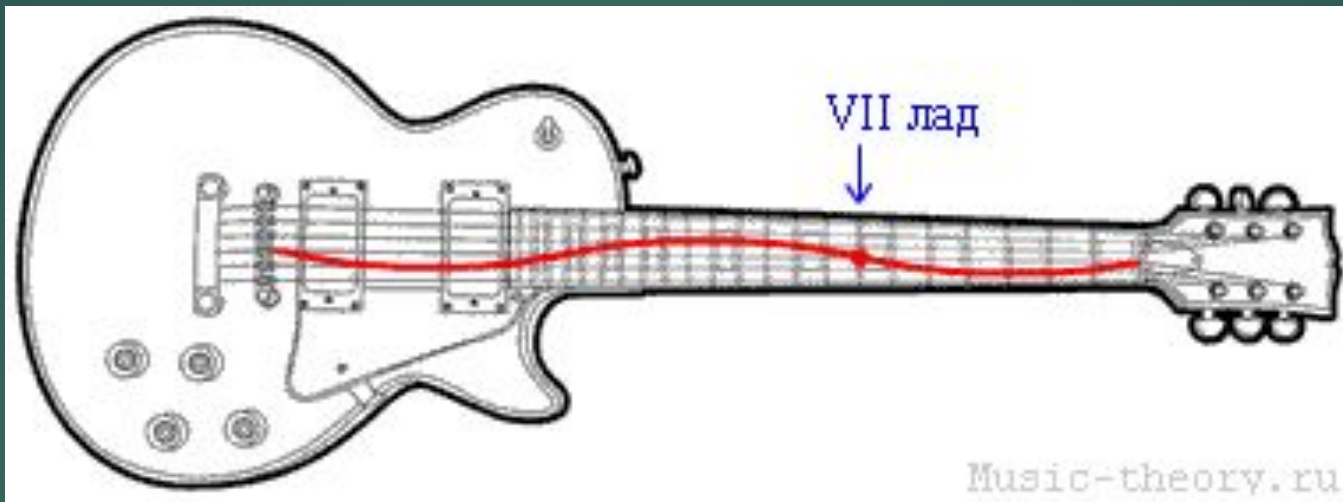
ОСНОВНОЙ ТОН И ОБЕРТОНЫ



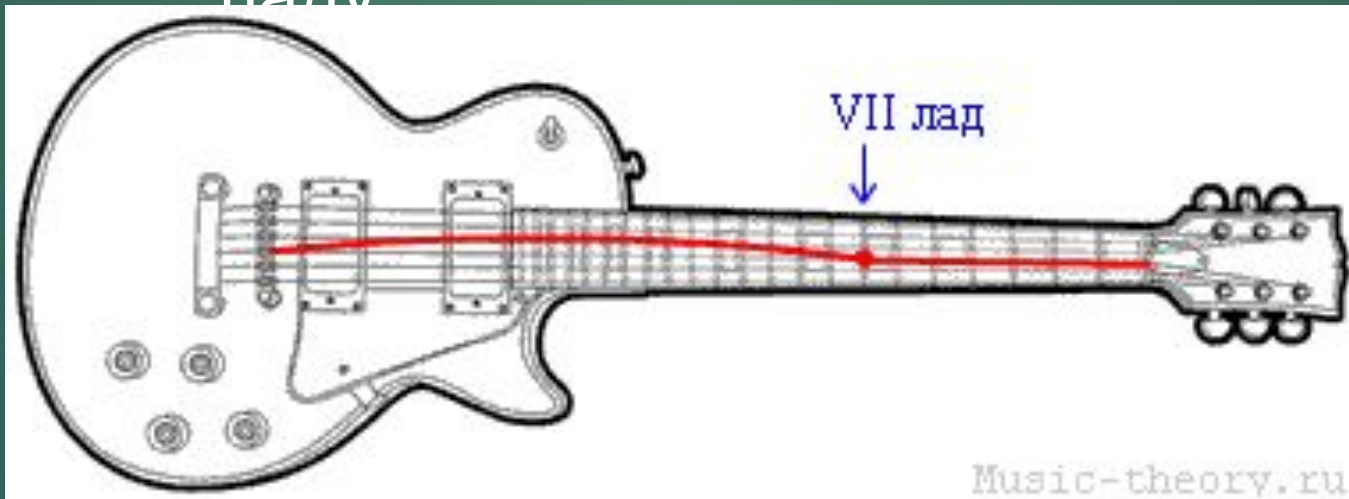
Натуральный флажолет на XII
палу



Колебания струны, прижатой на XII
ладу



Натуральный флажолет на VII ладу



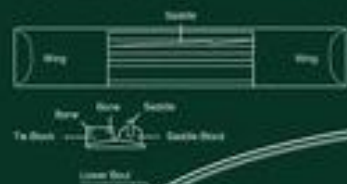
Колебания струны, прижатой на XII ладу

Использование законов физики в музыке



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The bridge and saddle transfer vibrations from the strings to the soundboard. The saddle is made from bone or plastic, and is compensated to provide proper intonation. It determines string height and effective length. The bridge is usually made from a single piece of rosewood or ebony. It consists of a saddle block that houses the saddles, and a deck block into which strings are tied. The bridge is also braced with bars on both sides to prevent the strings from distorting the wood and often contains a decorative inlay. Wings on either side of the bridge transfer the pulling force from the strings to the soundboard.

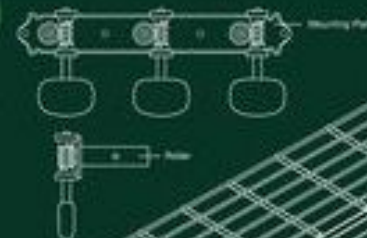


Soundboard Bracing Patterns



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The headstock is attached to the top of the neck, and contains the tuning machines. The neck and headstock are often carved from a single piece of wood. They are also braced together with a head plate. The weight and length of the headstock affect the sound of the guitar. It is shaped to house the strings body precisely on the nut. Classical guitar headstocks are usually locking. The tuning machine refers. The tuning machines are mounted on the sides and use gears to provide precise and stable tuning. Often, tuning machines are casted in three on a single mounting plate. A hardened washer is often glued to the back of the headstock to reinforce the headstock and cover up any exposed grain ends.



NUT

The nut is located at the top of the fretboard at the base of the headstock. It determines string spacing and height at the zero fret. The nut is made from bone or plastic and is compensated to ensure proper action and intonation. The string sitting flat on the nut prevents the string from vibrating and causes the string to break.

STRINGS

The highest three strings on the guitar are made from nylon. Traditionally, these strings were made from gut. These strings are made from two nylon filaments wound in various ways or silver plated copper wire. These are all wound in pairs. Strings of historical guitars contain two braided silver wound tri-plex strings, which wraping over the nut.



Выполнил: Леонов Юрий
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